Zebra® ZT400 Series™

User Guide

ZEBRA
TECHNOLOGIES

P1066582-002 Rev. B

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Part Number: P1066582-002 Rev. A

Declaration of Conformity

We have determined that the Zebra printers identified as the

ZT410™ and ZT420™

manufactured by:

Zebra Technologies Corporation
475 Half Day Road, Suite 500
Lincolnshire, Illinois 60069 U.S.A.

Have been shown to comply with the applicable technical standards of the FCC

For Home, Office, Commercial, and Industrial use

If no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

Compliance Information

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Note • This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement (for printers with RFID encoders)

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Canadian DOC Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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About This Document

This section provides you with contact information, document structure and organization, and additional reference documents.

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Who Should Use This Document

This User Guide is intended for use by any person who needs to perform routine maintenance, upgrade, or troubleshoot problems with the printer.

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
Introduction on page 11	This section provides a high-level overview of the printer and its components.
Printer Setup and Operation on page 21	This section assists the technician with initial setup and operation of the printer.
Printer Configuration and Adjustment on page 65	This section assists you with configuration of and adjustments to the printer.
Routine Maintenance on page 129	This section provides routine cleaning and maintenance procedures.
Troubleshooting on page 145	This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.
Specifications on page 173	This section lists general printer specifications, printing specifications, ribbon specifications, and media specifications.
Glossary on page 179	The glossary provides a list of common terms.

1

Introduction

This section provides a high-level overview of the printer and its components.

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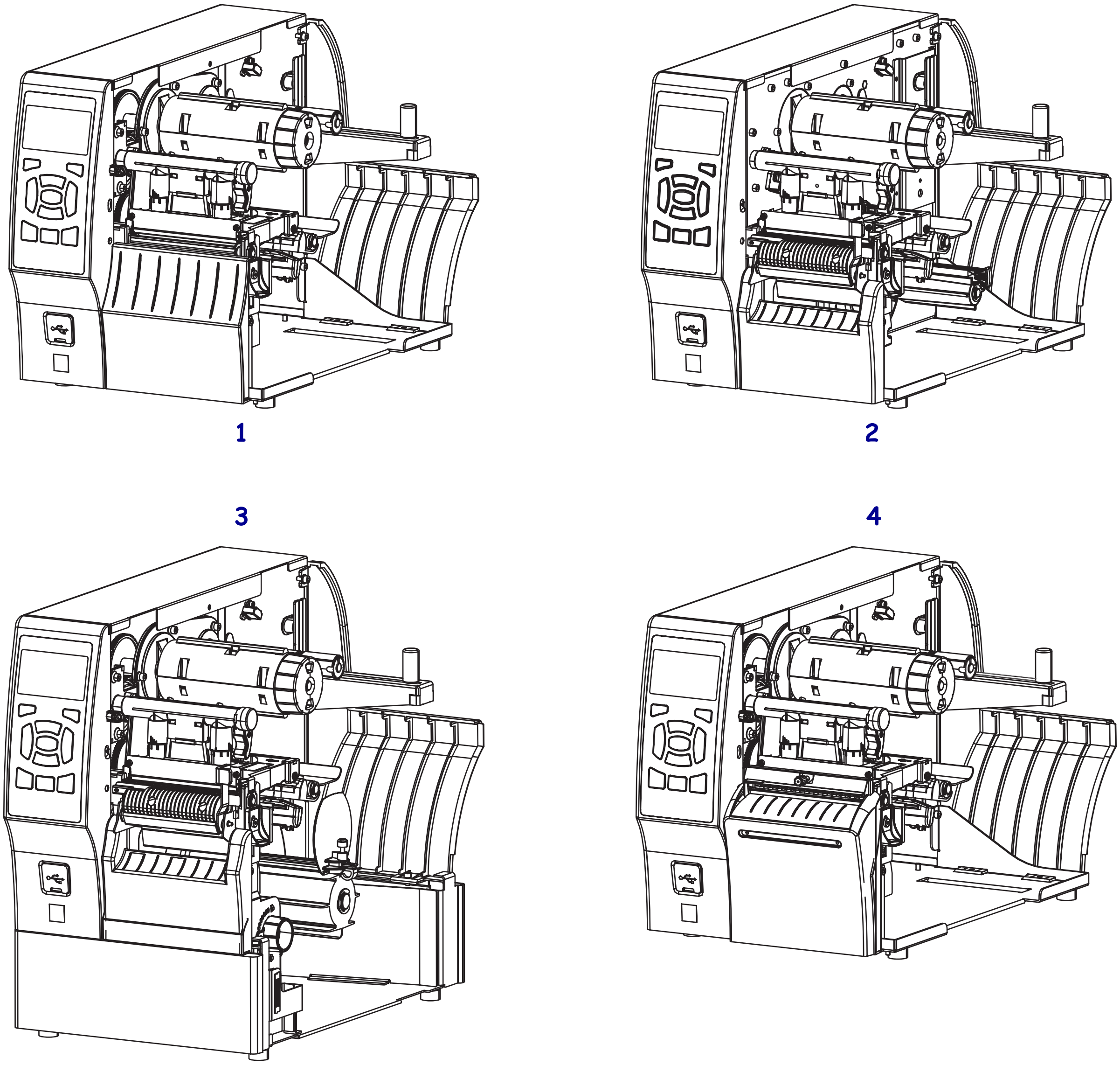
Printer Options

The available printer options are shown in Figure 1. For information about the print modes that can be used with the printer options, see *Select a Print Mode* on page 30.

Figure 1 • Printer Options



1	Tear-Off (standard)
2	Peel with Liner Take-Up option
3	Rewind option
4	Cutter option

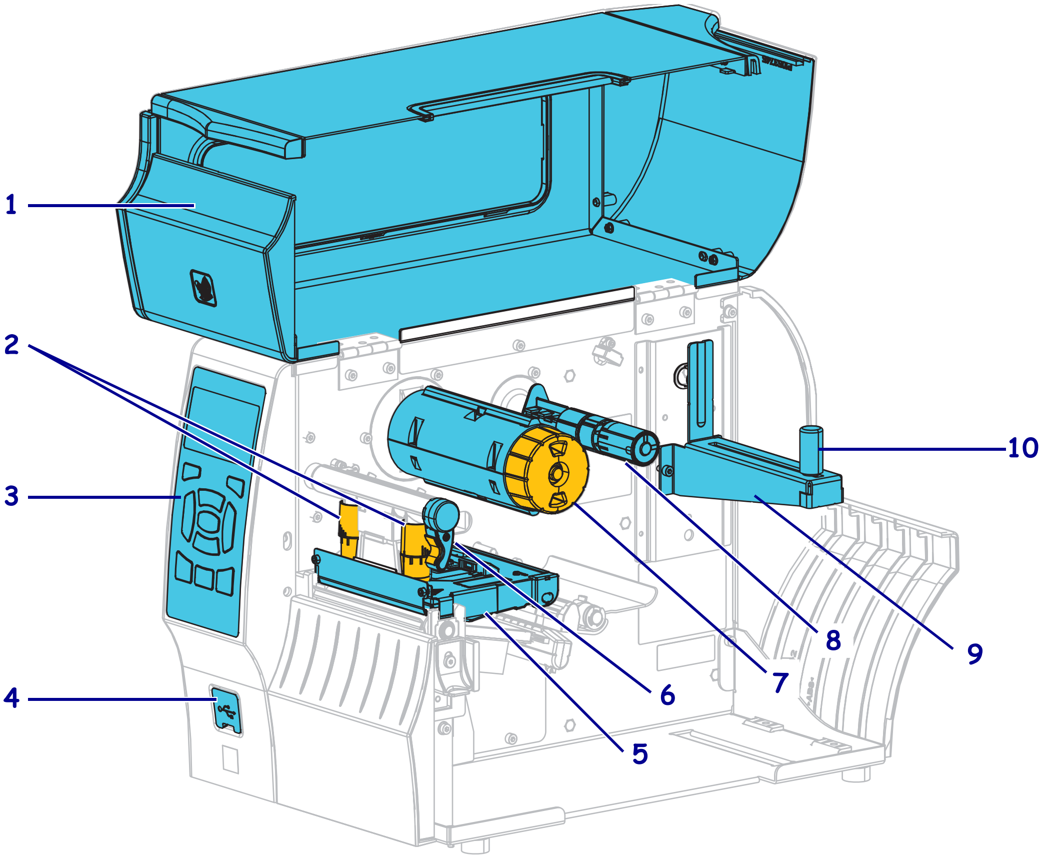
Printer Components

Note • The components inside your printer are color-coded.

- The touch points that you will need to handle are colored **gold** inside the printers and are highlighted in **gold** in the illustrations in this manual.
- The components associated with the ribbon system are made of **black** plastic, while the components associated with media are made of **gray** plastic. Those components and others are highlighted in **light blue** in the illustrations in this manual as needed.

Figure 2 shows the components inside the media compartment of a standard printer. Depending on the printer model and the installed options, your printer may look slightly different. The components that are labeled are mentioned in procedures throughout this manual.

Figure 2 • Printer Components



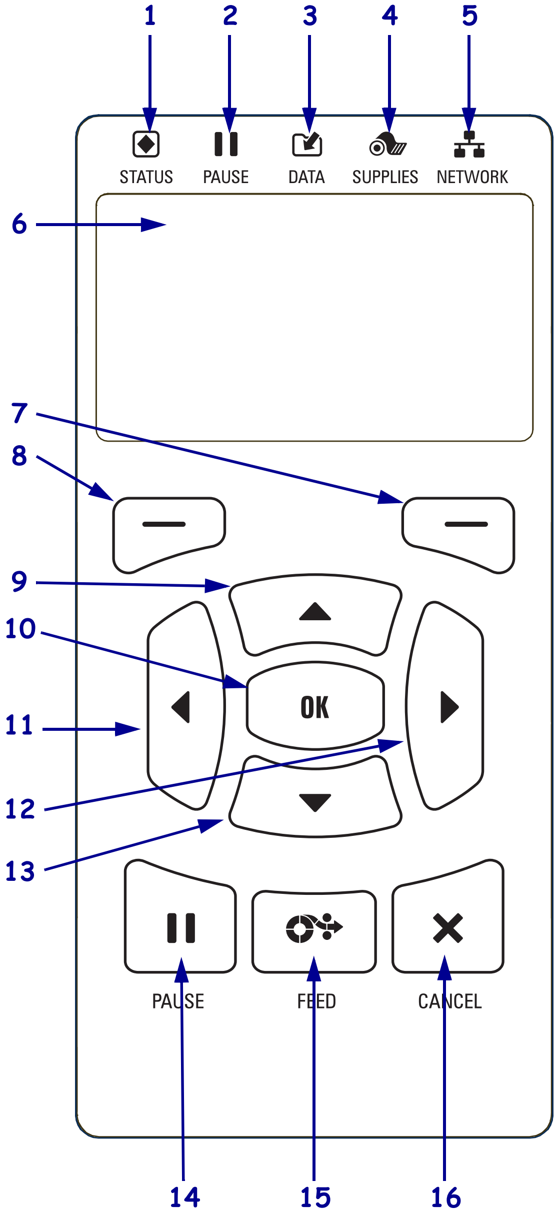
1	Media door		6	Printhead-open lever
2	Printhead pressure adjustment toggles		7	Ribbon take-up spindle*
3	Control panel		8	Ribbon supply spindle*
4	USB host port		9	Media supply hanger
5	Printhead assembly		10	Media supply guide

* This component appears only in printers that have the Thermal Transfer option installed.

Control Panel

The control panel indicates the printer’s current status and allows the user to control basic printer operation.

Figure 3 • Control Panel

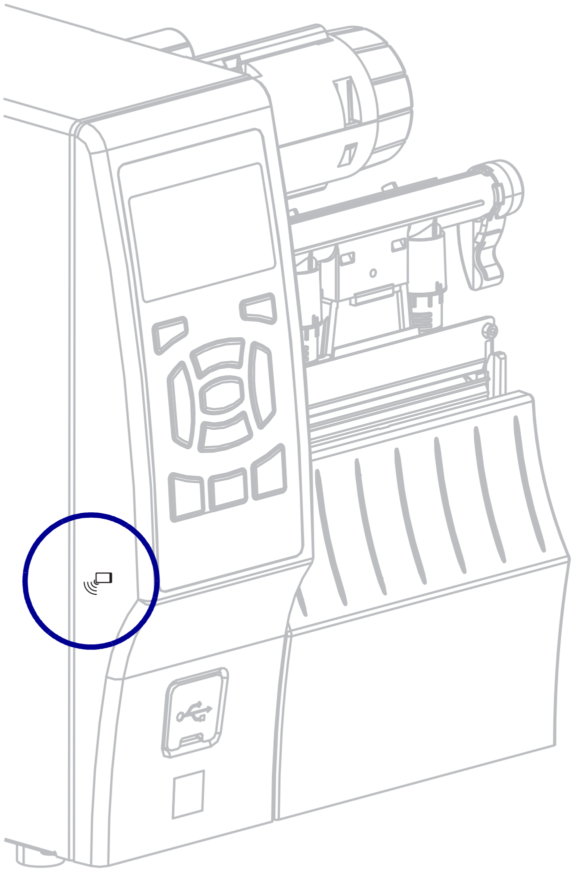


1	◈	**STATUS light**	These **indicator lights** show the current status of the printer. For more information, see Table 1 on page 146.
2	❚❚	**PAUSE light**	
3	☑	**DATA light**	
4	◎	**SUPPLIES light**	
5	☍	**NETWORK light**	
6	The **display** shows the printer’s current status and allows the user to navigate the menu system.		
7	**RIGHT SELECT button**		These buttons execute the commands shown directly above them in the display.
8	**LEFT SELECT button**		
9	The **UP ARROW button** changes the parameter values. Common uses are to increase a value or to scroll through choices.		
10	The **OK button** selects or confirms what is shown on the display.		
11	The **LEFT ARROW button**, which is active only in the menu system, navigates to the left.		
12	The **RIGHT ARROW button**, which is active only in the menu system, navigates to the right.		
13	The **DOWN ARROW button** changes the parameter values. Common uses are to decrease a value or to scroll through choices.		
14	The **PAUSE button** starts or stops printer operation when pressed.		
15	The **FEED button** forces the printer to feed one blank label each time the button is pressed.		
16	The **CANCEL button** cancels label formats when the printer is paused. • Press once to cancel the next label format. • Press and hold for 2 seconds to cancel all label formats.		

Near Field Communication (NFC)

The Zebra Print Touch™ feature allows you to touch an Android™-based, NFC-enabled smartphone or tablet to the Zebra Print Touch logo (Figure 4) to pair the device to the printer. Your device then launches an app that displays a menu of choices that are specific to your Zebra printer.

Figure 4 • Print Touch Logo Location

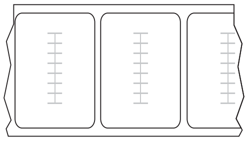


Types of Media

Important • Zebra strongly recommends the use of Zebra-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to prevent premature printhead wear. To purchase supplies, go to http://www.zebra.com/howtobuy.

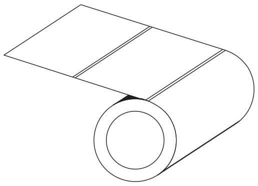
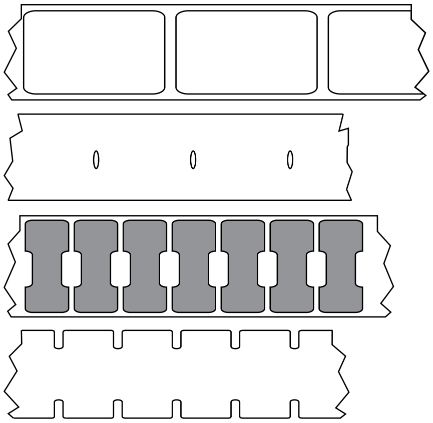
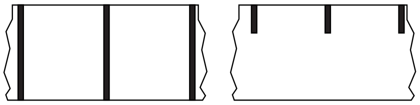
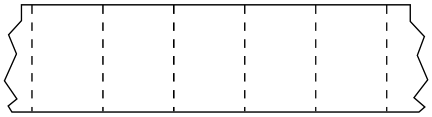
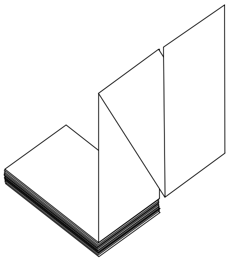
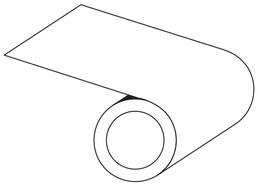
Your printer can use various types of media:

- *Standard media*—Most standard media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner. Standard media can come on rolls or in a fanfold stack (Table 1).
- *Tag stock*—Tags are usually made from a heavy paper. Tag stock does not have adhesive or a liner, and it is typically perforated between tags. Tag stock can come on rolls or in a fanfold stack (Table 1).
- *Radio frequency identification (RFID) "smart" media*—RFID media can be used in a printer that is equipped with an RFID reader/encoder. RFID labels are made from the same materials and adhesives as non-RFID labels. Each label has an RFID transponder (sometimes called an "inlay"), made of a chip and an antenna, embedded between the label and the liner. The shape of the transponder varies by manufacturer and is visible through the label. All "smart" labels have memory that can be read, and many have memory that can be encoded.



Important • Transponder placement within a label depends on the transponder type and the printer model. Make sure that you are using the correct "smart" media for your printer. For more information, refer to the *RFID Programming Guide 3*. A copy of the manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer. For transponder placement details, go to http://www.zebra.com/transponders.

Table 1 • Roll and Fanfold Media

Media Type	How It Looks	Description
Non-Continuous Roll Media		Roll media is wound on a core that can be 1 in. to 3 in. (25 to 76 mm) in diameter. Individual labels or tags are separated by one or more of the following methods: - *Web media* separates labels by gaps, holes, or notches.  - *Black mark media* uses pre-printed black marks on the back side of the media to indicate label separations.  - *Perforated media* has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags. 
Non-Continuous Fanfold Media		Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.
Continuous Roll Media		Roll media is wound on a core that can be 1 in. to 3 in. (25 to 76 mm) in diameter. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels.

Ribbon Overview

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin, which is transferred to the media during the thermal transfer process. The media determines whether you need to use ribbon and how wide the ribbon must be.

When ribbon is used, it must be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear.

When to Use Ribbon

Thermal transfer media requires ribbon for printing while direct thermal media does not. To determine if ribbon must be used with a particular media, perform a media scratch test.

To perform a media scratch test, complete these steps:

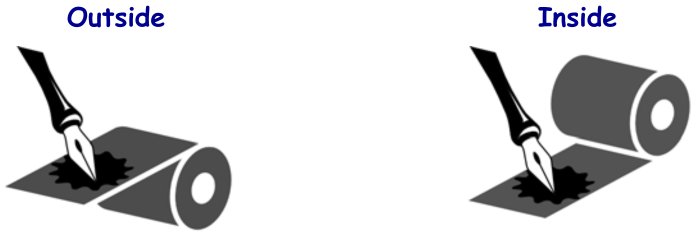
1. Scratch the print surface of the media rapidly with your fingernail.
2. Did a black mark appear on the media?

If a black mark...	Then the media is...
Does not appear on the media	**Thermal transfer**. A ribbon is required.
Appears on the media	**Direct thermal**. No ribbon is required.

Coated Side of Ribbon

Ribbon can be wound with the coated side on the inside or outside (Figure 5). This printer can only use ribbon that is coated on the outside. If you are unsure which side of a particular roll of ribbon is coated, perform an adhesive test or a ribbon scratch test to determine which side is coated.

Figure 5 • Ribbon Coated on Outside or Inside

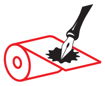
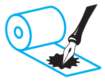


Adhesive Test

If you have labels available, perform the adhesive test to determine which side of a ribbon is coated. This method works well for ribbon that is already installed.

To perform an adhesive test, complete these steps:

1. Peel a label from its liner.
2. Press a corner of the sticky side of the label to the outer surface of the roll of ribbon.
3. Peel the label off of the ribbon.
4. Observe the results. Did flakes or particles of ink from the ribbon adhere to the label?

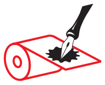
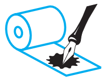
If ink from the ribbon...	Then...
Adhered to the label	The ribbon is coated on the outside and **can** be used in this printer. 
Did not adhere to the label	The ribbon is coated on the inside and **cannot** be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon. 

Ribbon Scratch Test

Perform the ribbon scratch test when labels are unavailable.

To perform a ribbon scratch test, complete these steps:

1. Unroll a short length of ribbon.
2. Place the unrolled section of ribbon on a piece of paper with the outer surface of the ribbon in contact with the paper.
3. Scratch the inner surface of the unrolled ribbon with your fingernail.
4. Lift the ribbon from the paper.
5. Observe the results. Did the ribbon leave a mark on the paper?

If the ribbon...	Then...
Left a mark on the paper	The ribbon is coated on the outside and **can** be used in this printer. 
Did not leave a mark on the paper	The ribbon is coated on the inside and **cannot** be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon. 

Notes • ___________________________________

2

Printer Setup and Operation

This section assists the technician with initial setup and operation of the printer.

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Handling the Printer

This section describes how to handle your printer.

Unpack and Inspect the Printer

When you receive the printer, immediately unpack it and inspect for shipping damage.

- Save all packing materials.
- Check all exterior surfaces for damage.
- Raise the media door, and inspect the media compartment for damage to components.

If you discover shipping damage upon inspection:

- Immediately notify the shipping company and file a damage report.
- Keep all packaging material for shipping company inspection.
- Notify your authorized Zebra reseller

Important • Zebra Technologies is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.

Store the Printer

If you are not placing the printer into immediate operation, repackage it using the original packing materials. You may store the printer under the following conditions:

- Temperature: –40°F to 140°F (–40° to 60°C)
- Relative humidity: 5% to 85% non-condensing

Ship the Printer

If you must ship the printer:

- Turn off (**O**) the printer, and disconnect all cables.
- Remove any media, ribbon, or loose objects from the printer interior.
- Close the printhead.
- Carefully pack the printer into the original container or a suitable alternate container to avoid damage during transit. A shipping container can be purchased from Zebra if the original packaging has been lost or destroyed.

Select a Location for the Printer

Select a location for the printer that meets these conditions:

- **Surface:** The surface where the printer will be located must be solid, level, and of sufficient size and strength to hold the printer.
- **Space:** The area where the printer will be located must include enough space for ventilation and for accessing the printer components and connectors. To allow for proper ventilation and cooling, leave open space on all sides of the printer.

Caution • Do not place any padding or cushioning material behind or under the printer because this restricts air flow and could cause the printer to overheat.

- **Power:** The printer should be within a short distance of an appropriate power outlet that is easily accessible.
- **Data communication interfaces:** The printer must be within range of your WLAN radio (if applicable) or within an acceptable range for other connectors to reach your data source (usually a computer). For more information on maximum cable lengths and configuration, see Table 2 on page 25.
- **Operating conditions:** Your printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. Table 1 shows the temperature and relative humidity requirements for the printer when it is operating.

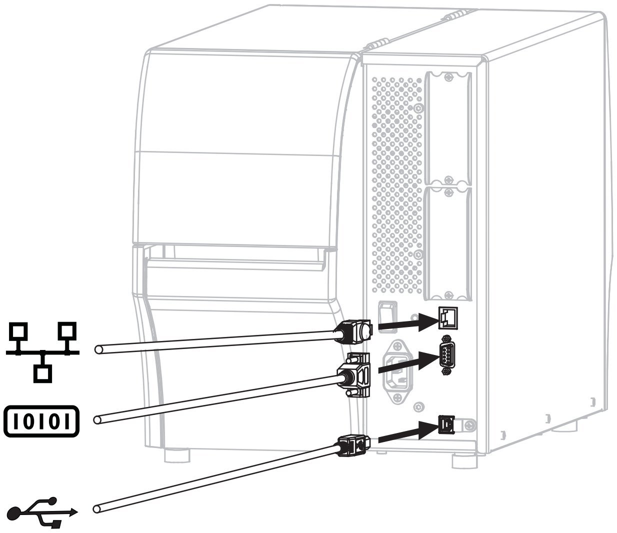
Table 1 • Operating Temperature and Humidity

Mode	Temperature	Relative Humidity
Thermal Transfer	40° to 104°F (5° to 40°C)	20 to 85% non-condensing
Direct Thermal	32° to 104°F (0° to 40°C)	

Select a Communication Interface

You may connect your printer to a computer using one or more of the available connections. The standard connections are shown in Figure 1. A ZebraNet wired or wireless print server option or a parallel port may also be present on your printer.

Figure 1 • Communication Interfaces



🖧	Internal wired Ethernet print server
10101	Serial port
	USB port

Table 2 on page 25 provides basic information about communication interfaces that you can use to connect your printer to a computer. You may send label formats to the printer through any communication interface that is available. Select an interface that is supported by both your printer and your computer or your Local Area Network (LAN).

Caution • Ensure that the printer power is off (**O**) before connecting data communications cables. Connecting a data communications cable while the power is on (**I**) may damage the printer.

Table 2 • Communication Interfaces

Interface	Standard or Option	Description
Bluetooth®	Standard	**Limitations and Requirements** Many mobile devices can communicate with the printer within a 10-foot radius of the printer.
		Connections and Configuration Refer to the *Zebra Bluetooth User Guide* for specific instructions for configuring your printer to use a Bluetooth interface. A copy of this manual is available at http://www.zebra.com/manuals.
RS-232 Serial	Standard	**Limitations and Requirements** • Maximum cable length of 50 ft (15.24 m). • You may need to change printer parameters to match the host computer. • You need to use a null-modem adaptor to connect to the printer if using a standard modem cable.
		Connections and Configuration The baud rate, number of data and stop bits, the parity, and the XON/XOFF or DTR control must match those of the host computer.
USB	Standard	**Limitations and Requirements** • Maximum cable length of 16.4 ft (5 m). • No printer parameter changes required to match the host computer.
		Connections and Configuration No additional configuration is necessary.
Wired Ethernet print server	Standard	**Limitations and Requirements** • Can print to the printer from any computer on your LAN. • Can communicate with the printer through the printer's web pages. • The printer must be configured to use your LAN. • A parallel connection or a wireless print server (if installed) takes up this port on the printer. **Caution •** Be careful not to plug a USB cable into a wired Ethernet print server connector on the printer because doing so will damage the Ethernet connector.
		Connections and Configuration Refer to the *ZebraNet Wired and Wireless Print Servers User Guide* for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals. **Note •** To use this connection, you may need to remove a factory-installed plug that is designed to keep someone from accidentally plugging a USB connector into this port.

Table 2 • Communication Interfaces (Continued)

Interface	Standard or Option	Description
8-bit Parallel data interface	Option	**Limitations and Requirements** • Maximum cable length of 10 ft (3 m). • Recommended cable length of 6 ft (1.83 m). • No printer parameter changes required to match the host computer. • A wired or wireless print server (if installed) takes up this port on the printer.
		Connections and Configuration No additional configuration is necessary.
Wireless print server	Option	**Limitations and Requirements** • Can print to the printer from any computer on your Wireless Local Area Network (WLAN). • Can communicate with the printer through the printer's web pages. • The printer must be configured to use your WLAN. • A parallel connection or a wired print server (if installed) takes up this port on the printer.
		Configuration Refer to the *ZebraNet Wired and Wireless Print Servers User Guide* for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals.

Data Cables

You must supply all data cables for your application.

Ethernet cables do not require shielding, but all other data cables must be fully shielded and fitted with metal or metallized connector shells. Unshielded data cables may increase radiated emissions above the regulated limits.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

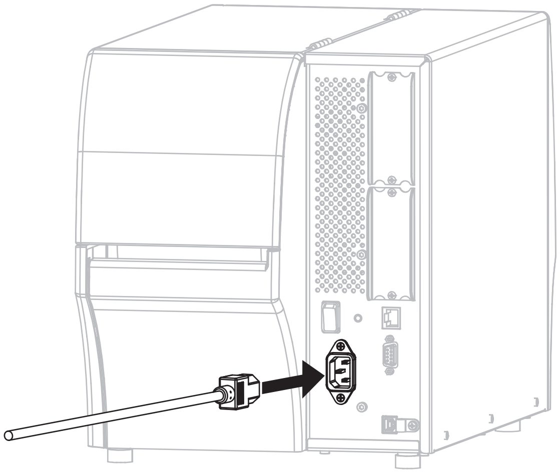
Connect the Printer to a Power Source

The AC power cord must have a three-prong female connector on one end that plugs into the mating AC power connector at the rear of the printer. If a power cable was not included with your printer, refer to *Power Cord Specifications* on page 28.

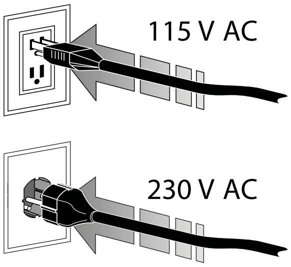
⚠ **Caution •** For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific three-conductor grounded plug configuration.

To connect the printer to a power source, complete these steps:

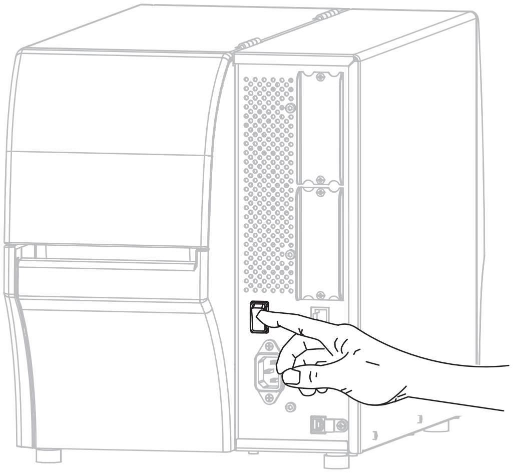
1. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



2. Plug the male end of the A/C power cord into an appropriate power outlet.



3. Turn on (**I**) the printer.



The printer boots up and performs a self-test. The printer reports its status through the indicator lights on the control panel (see Table 1 on page 146 for the meaning of the light colors and combinations).

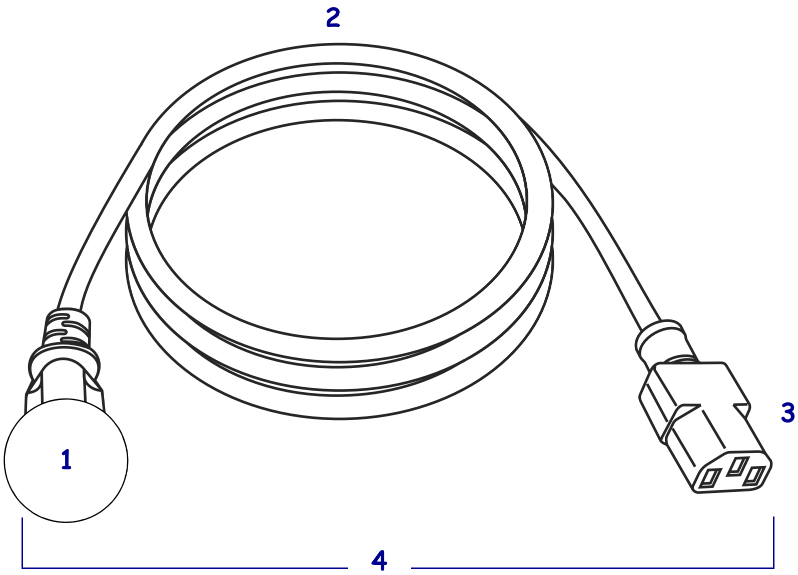
Power Cord Specifications

⚠ **Caution** • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific, three-conductor grounded plug configuration.

Depending on how your printer was ordered, a power cord may or may not be included. If one is not included or if the one included is not suitable for your requirements, see Figure 2 and refer to the following guidelines:

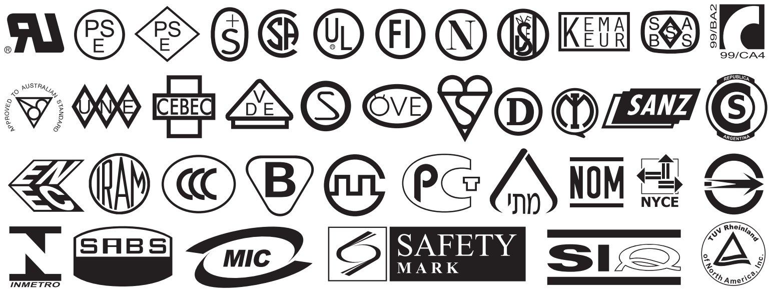
- The overall cord length must be less than 9.8 ft. (3 m).
- The cord must be rated for at least 10 A, 250 V.
- The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference.

Figure 2 • Power Cord Specifications



1	AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 3).
2	3-conductor HAR cable or other cable approved for your country.
3	IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 3).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp, 250 VAC.

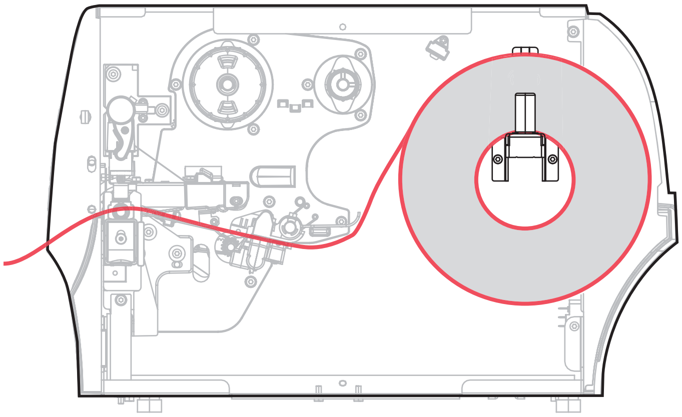
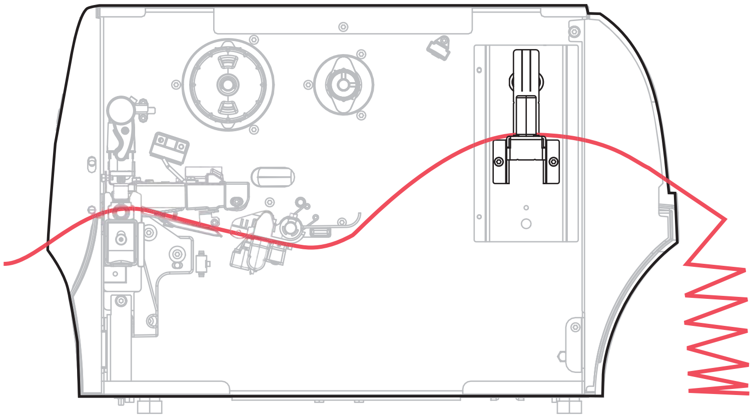
Figure 3 • International Safety Organization Certification Symbols


99/BA2
99/CA4
CEBEC
SANZ
NOM
NYCE
INMETRO
SABS
MIC
SAFETY
MARK
TÜV Rheinland of North America, Inc.

Select a Print Mode

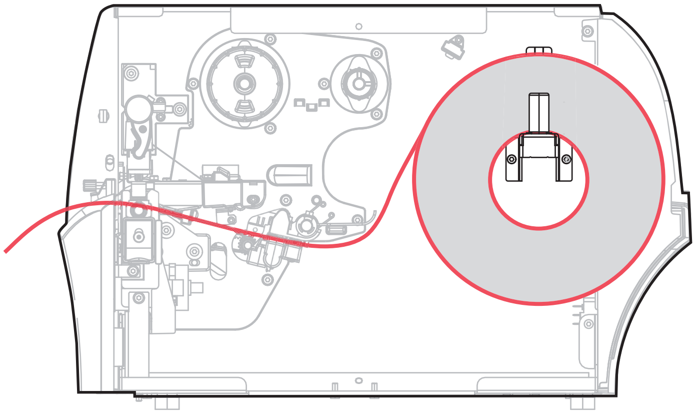
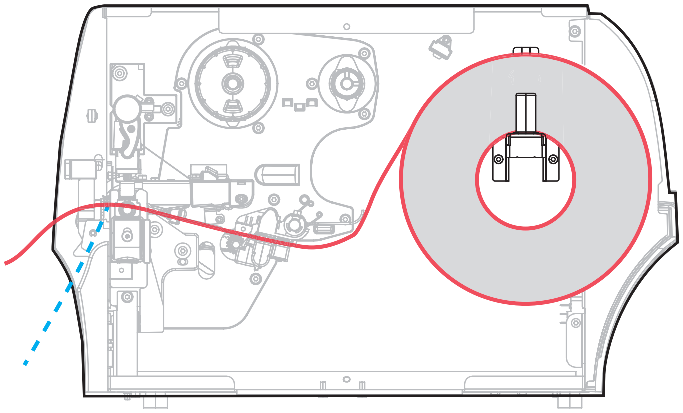
Use a print mode that matches the media being used and the printer options available (Table 3). The media path is the same for roll and fanfold media.

Table 3 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Tear-Off (default setting)	Use for most applications. This mode can be used with any printer options and most media types.	The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.
	Roll media in Tear-Off mode  **Fanfold media in Tear-Off mode** (shown fed through the rear access slot) 	

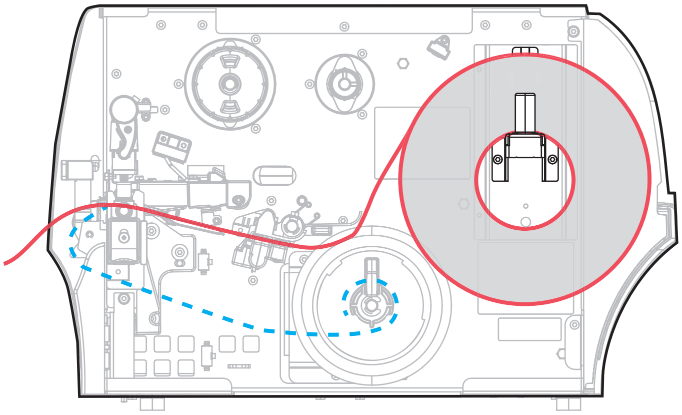
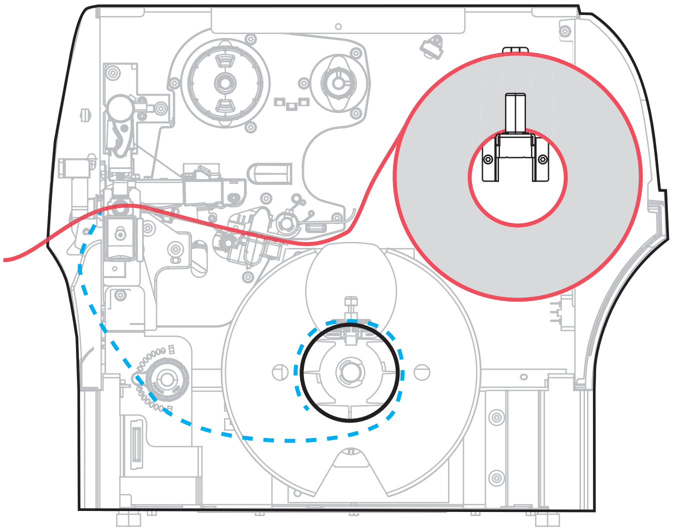
Red solid lines = media, Blue dotted lines = backing only

Table 3 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Cutter	Use if the printer has a cutter option when you want the labels to be cut apart.	The printer prints a label and then cuts it free.
	Cutter mode 	
Peel-Off	Use if the printer has the Peel-Off option, the Liner Take-Up option, or the Rewind option.	The printer peels the label from the liner during printing and then pauses until the label is removed. The liner exits the front of the printer.
	Peel-Off mode 	

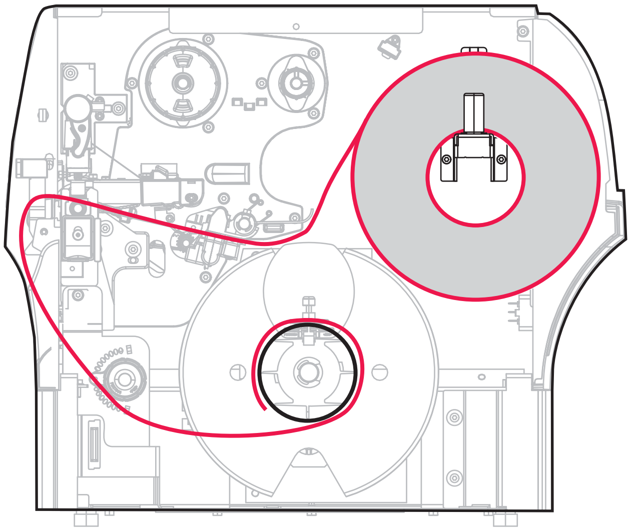
Red solid lines = media, Blue dotted lines = backing only

Table 3 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Peel-Off (with Liner Take-Up)	Use if the printer has the Liner Take-Up option or the Rewind option.	The printer peels the label from the liner during printing and then pauses until the label is removed. The liner winds onto the liner take-up spindle or the rewind spindle.
	Liner Take-Up Option  **Rewind Option** 	

Red solid lines = media, Blue dotted lines = backing only

Table 3 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Rewind	Use if the printer has the Rewind option.	The printer winds the labels and liner onto the rewind spindle without peeling the labels from the liner.
	Rewind mode 	

Red solid lines = media, Blue dotted lines = backing only

Load the Media

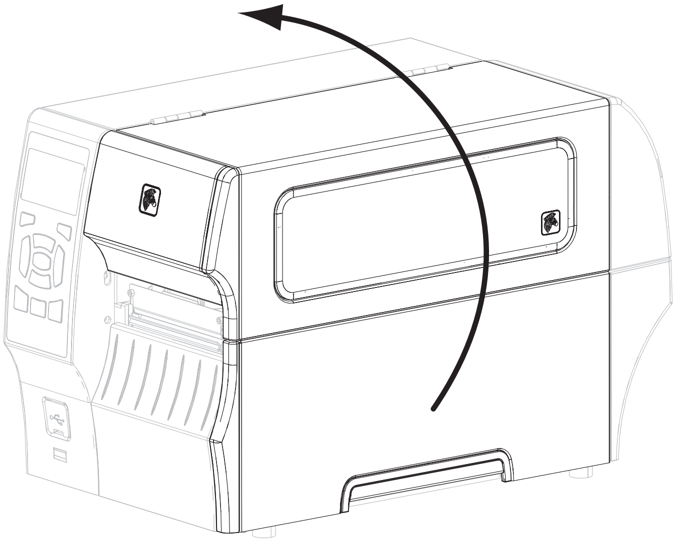
Use the instructions in this section for loading roll or fanfold media in any print mode.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

Note • In some of the drawings that follow, the printer is shown without a ribbon system to give you a better view of the components involved in media loading.

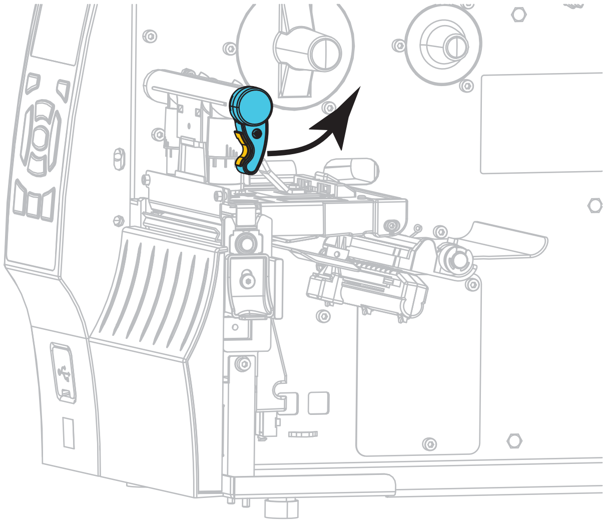
To load media, complete these steps:

1. Raise the media door.

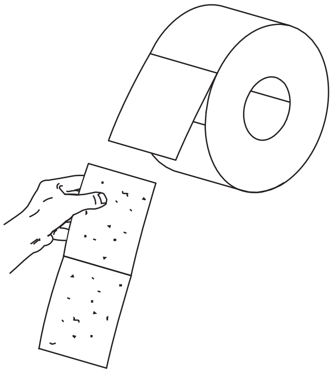
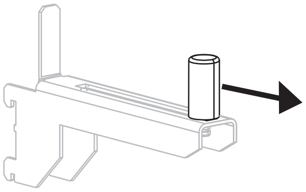


2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Open the printhead assembly by rotating the printhead-open lever.

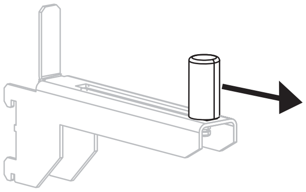


3. Insert media into the printer. Follow the instructions for roll or fanfold media, as appropriate.

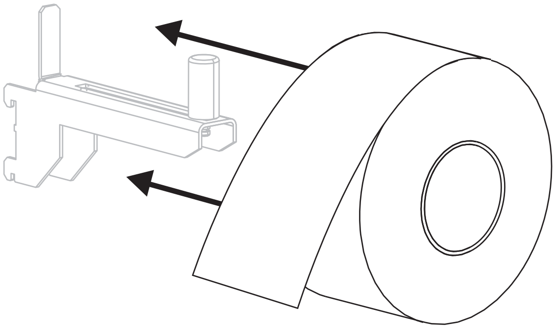
	Roll Media	**Fanfold Media**
3-a.	Remove and discard any tags or labels that are dirty or that are held by adhesives or tape. 	Pull out the media supply guide as far as it goes. 

Roll Media (Continued)

3-b. Pull out the media supply guide as far as it goes.



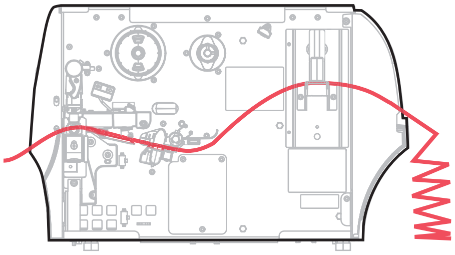
3-c. Place the roll of media on the media supply hanger. Push the roll back as far as it will go.



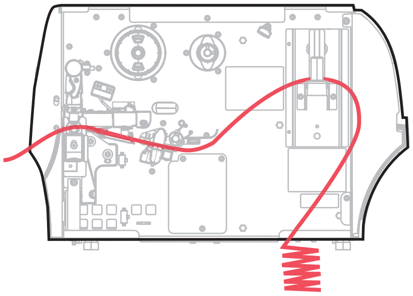
Fanfold Media (Continued)

Feed the media through the rear or bottom access slot.

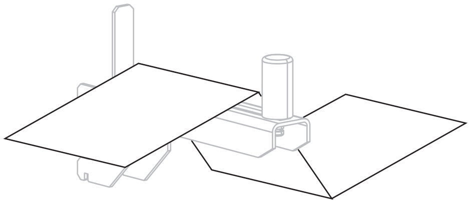
Rear Feed

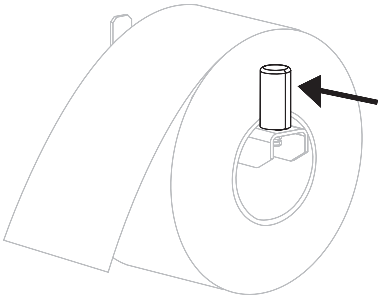
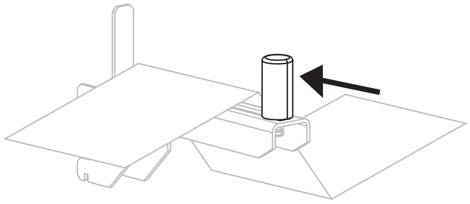


Bottom Feed

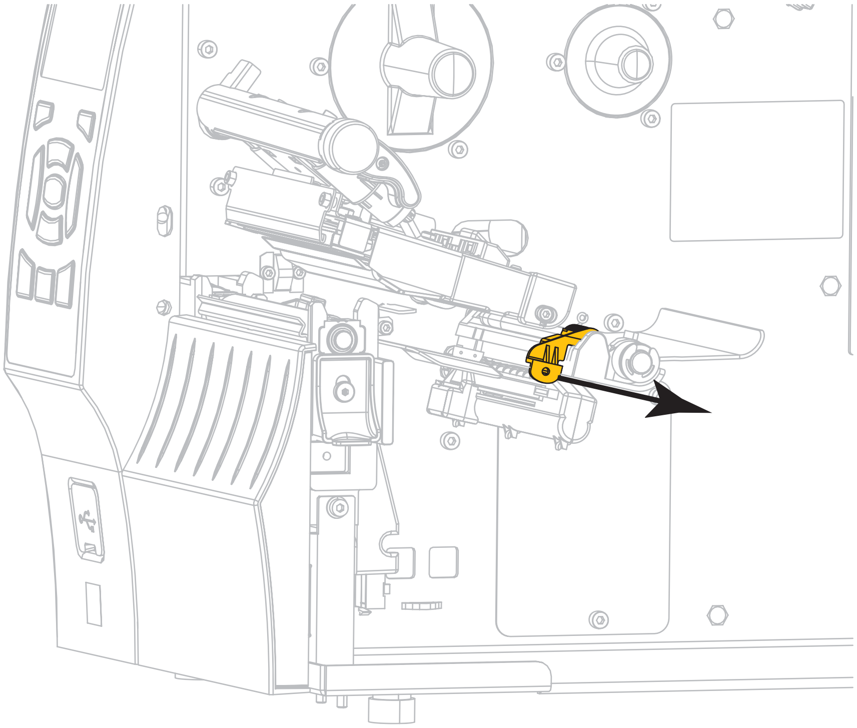


Drape the media over the media supply hanger.

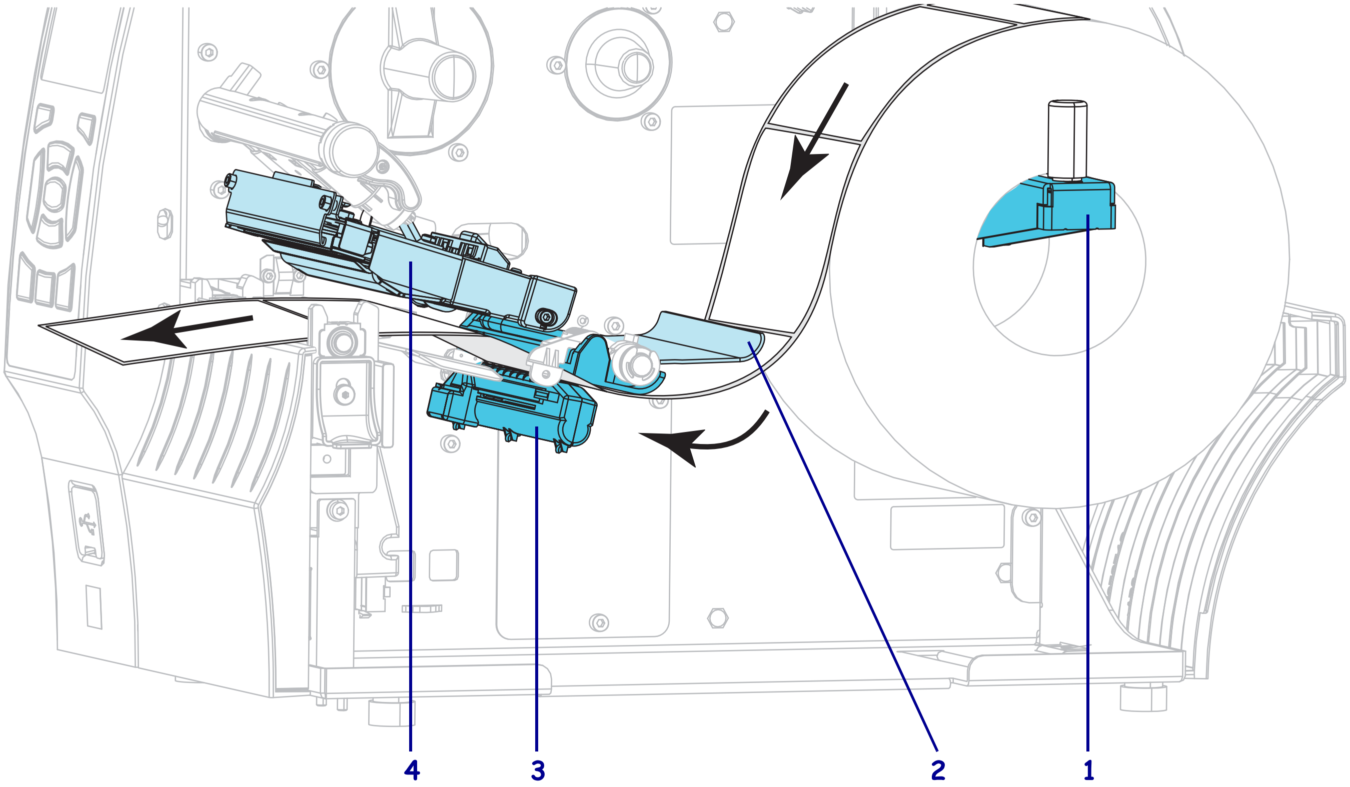


	Roll Media (Continued)	**Fanfold Media (Continued)**
3-d.	Slide in the media supply guide, until it touches the edge of the roll. 	Slide in the media supply guide, until it touches the edge of the media. 
3-e.	Continue with step 4.	Continue with step 4 and the remaining steps as shown for roll media.

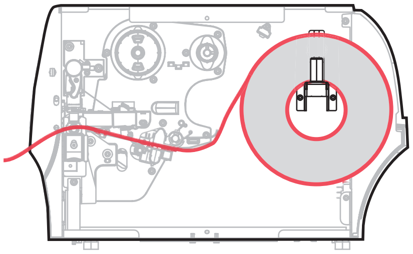
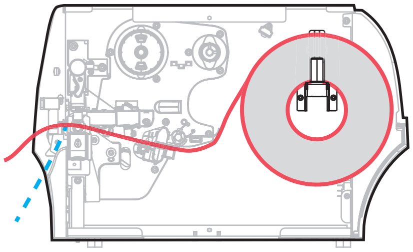
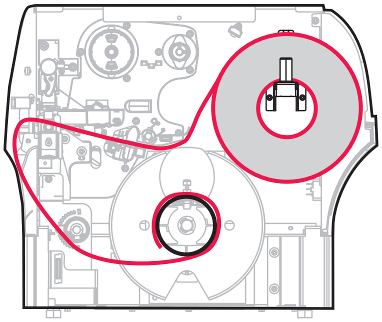
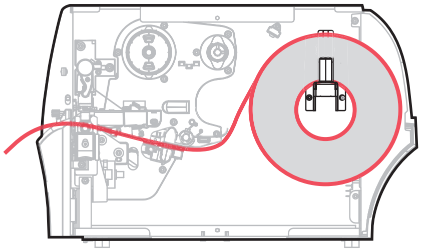
4. Slide the media guide all the way out.



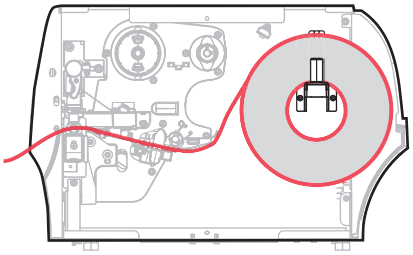
5. From the media hanger (**1**), feed the media under the dancer assembly (**2**), through the media sensor (**3**), and under the printhead assembly (**4**). Slide the media back until it touches the inside back wall of the media sensor.



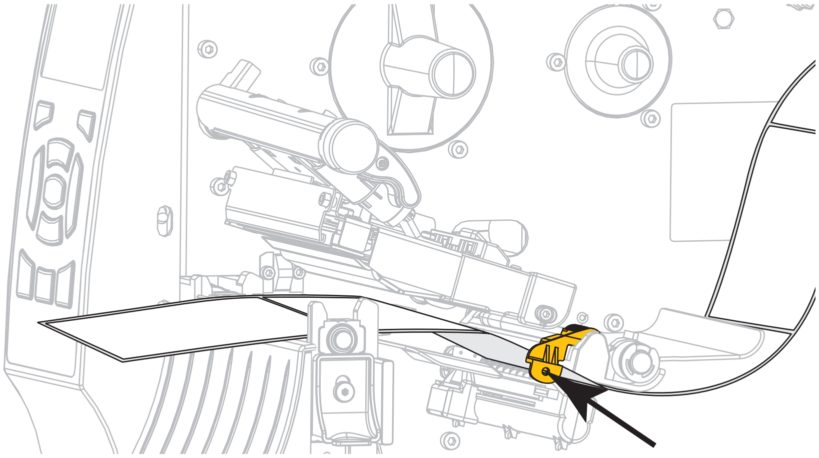
6. In which print mode will your printer be operating? (For more information on print modes, see *Select a Print Mode* on page 30.)

If using…	**Then…**
Tear-Off mode 	Continue with *Final Steps for Tear-Off Mode* on page 40.
Peel-Off mode (with or without Liner Take-Up) 	Continue with *Final Steps for Peel-Off Mode (with or without Liner Take-Up)* on page 42.
Rewind mode 	Continue with *Final Steps for Rewind Mode* on page 51.
Cutter mode 	Continue with *Final Steps for Cutter Mode* on page 57.

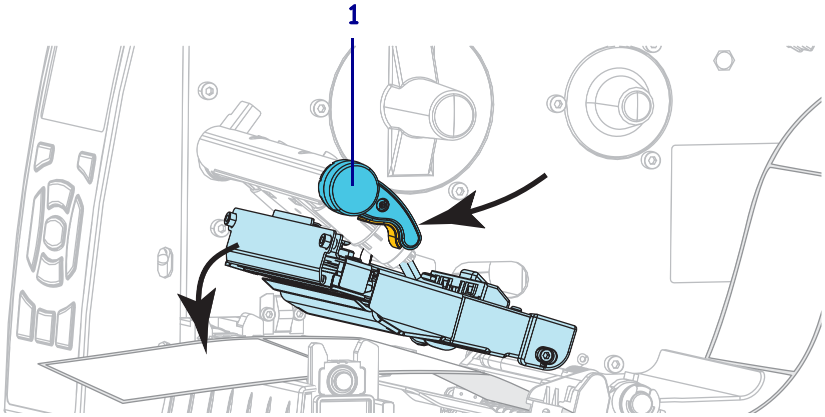
Final Steps for Tear-Off Mode



1. Slide in the media guide until it just touches the edge of the media.



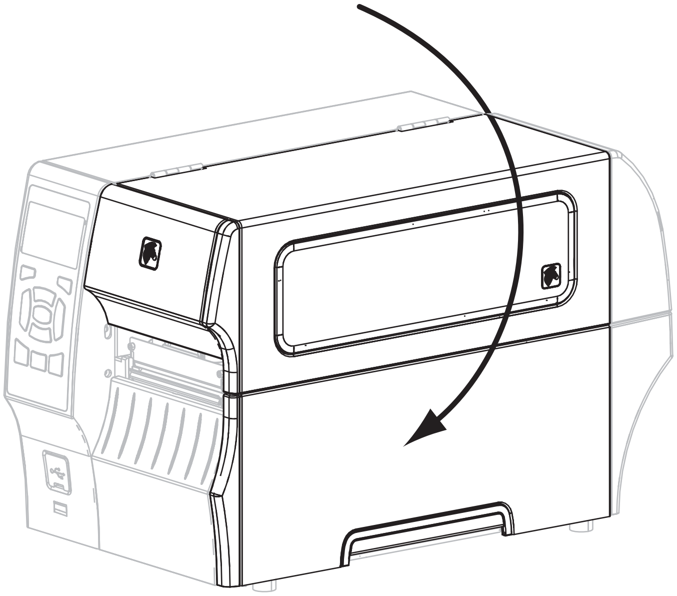
2. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



3. Does the media that you are using require ribbon for printing? If you are not sure, see *When to Use Ribbon* on page 18.

If using…	**Then…**
Direct Thermal media (no ribbon needed)	Continue with step 4.
Thermal Transfer media (ribbon needed)	**a.** If you have not already done so, load ribbon in the printer. See *Load the Ribbon* on page 60. **b.** Continue with step 4.

4. Close the media door.



5. Set the printer to Tear-Off mode (for more information, see *Print Mode* on page 69).

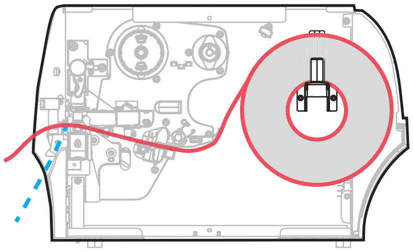
6. Press PAUSE to exit pause mode and enable printing.

The printer may perform a label calibration or feed a label, depending on your settings.

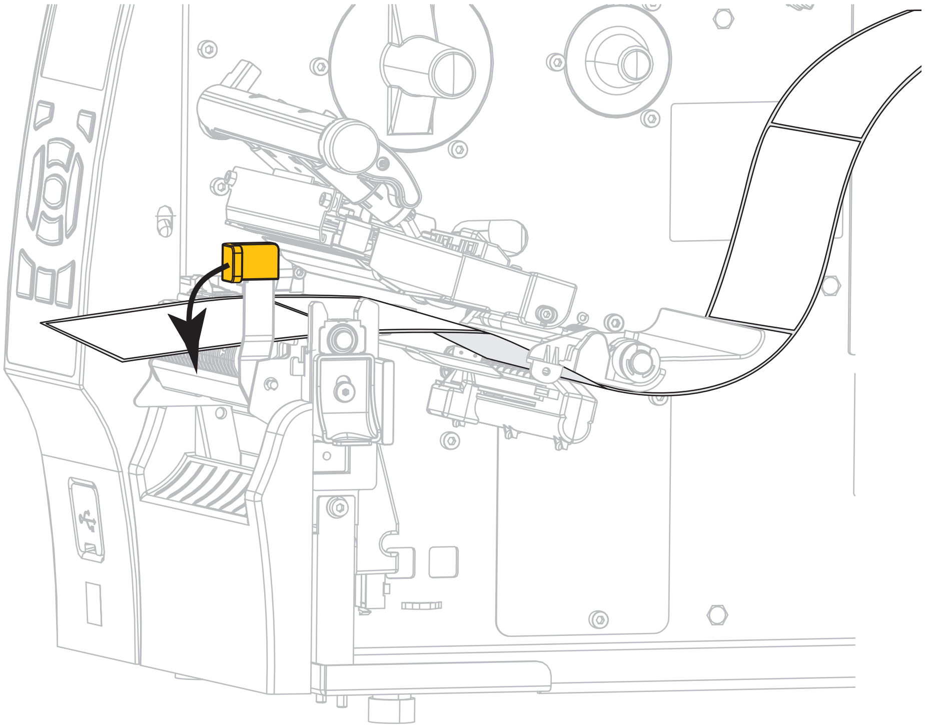
7. If desired, perform the *CANCEL Self Test* on page 163 to verify that your printer is able to print.

Media loading in Tear-Off mode is complete.

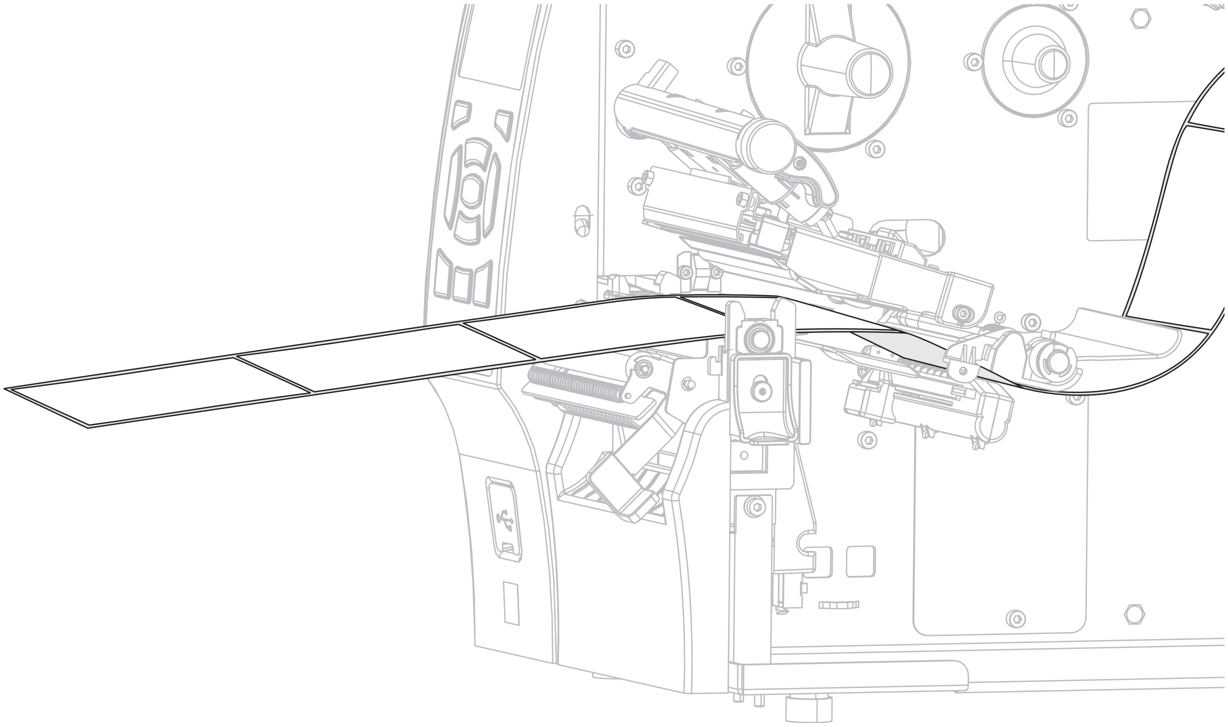
Final Steps for Peel-Off Mode (with or without Liner Take-Up)



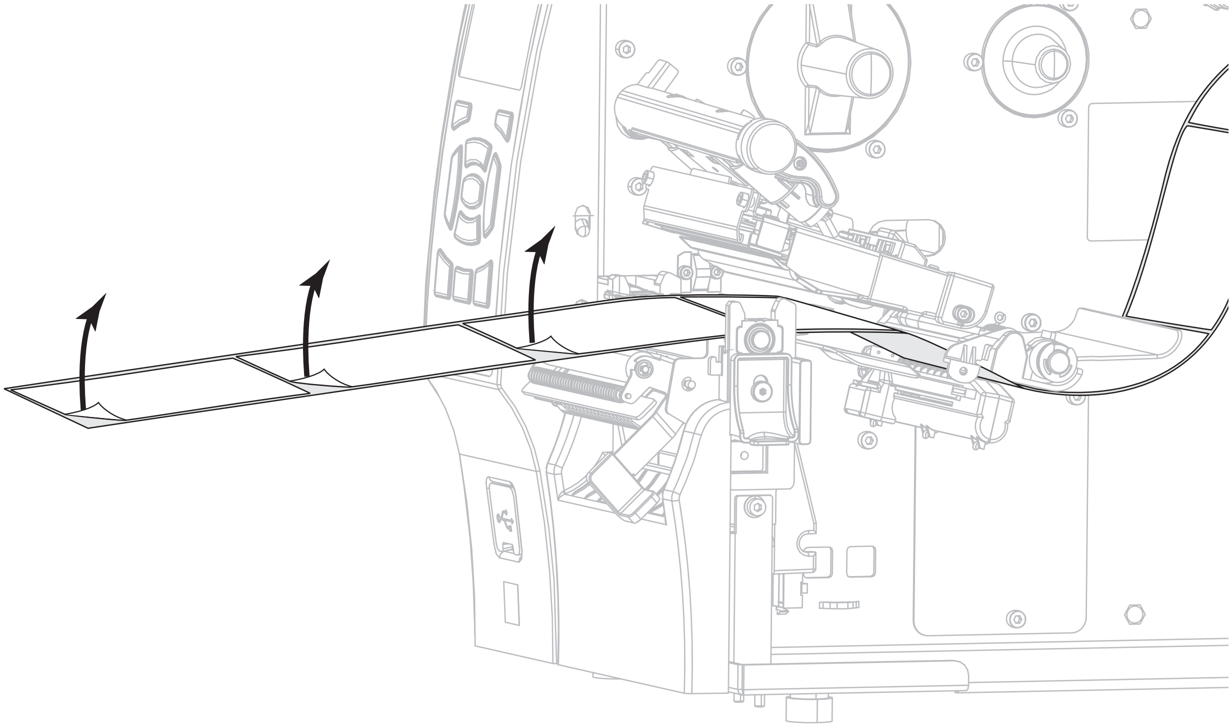
1. Push down the peel-off mechanism release lever to open the peel assembly.



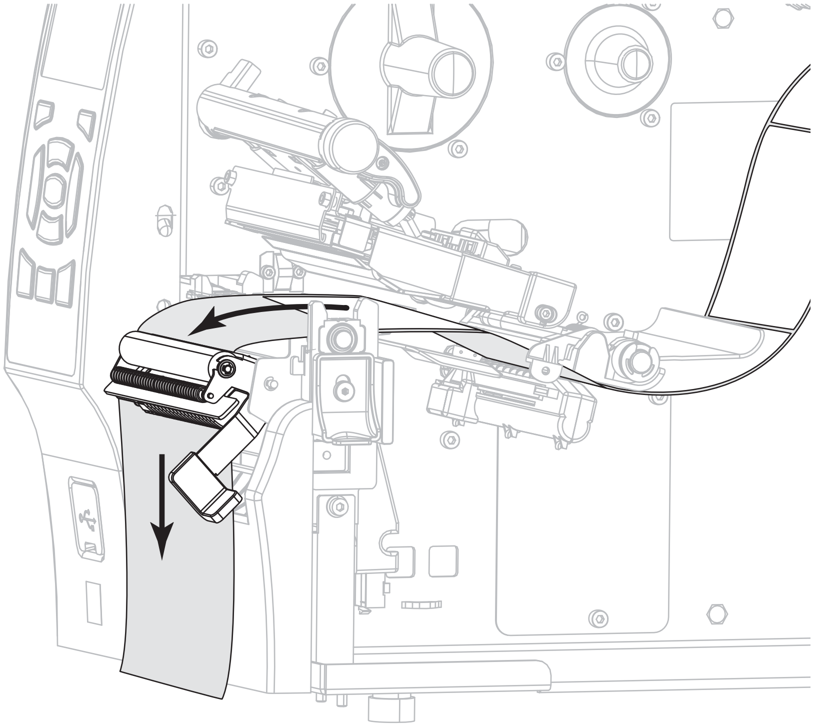
2. Extend the media approximately 18 in. (500 mm) out of the printer.



3. Remove the exposed labels so that only the liner remains.

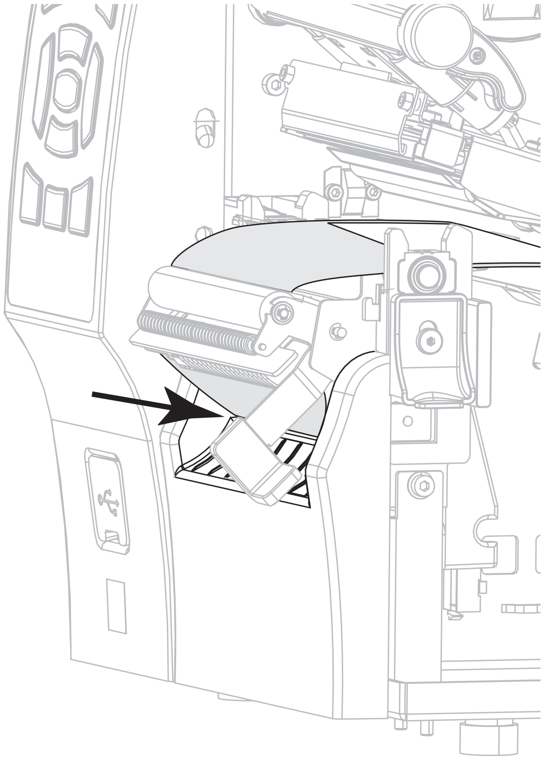


4. Feed the liner behind the peel assembly. Make sure that the end of the liner falls outside of the printer.

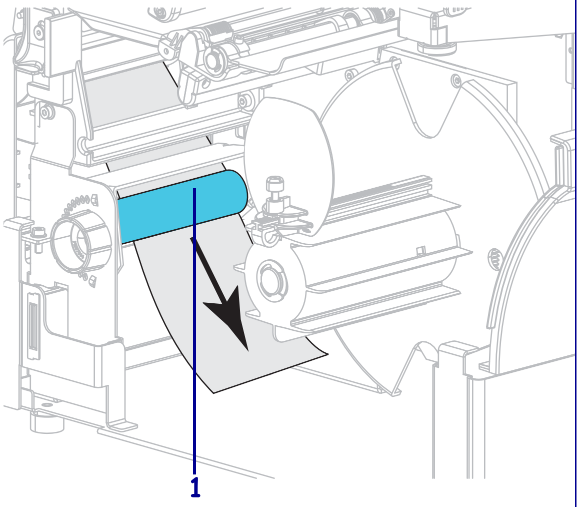


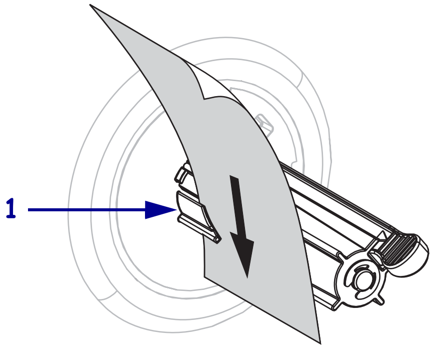
5. Complete this step only if you want to use Peel-Off mode with Liner Take-Up. Your printer must have the Liner Take-Up option or the Rewind option installed. Follow the instructions for your printer option. If you are not using Liner Take-Up, continue with step 6.

5-a. Thread the liner into the slot below the peel assembly.



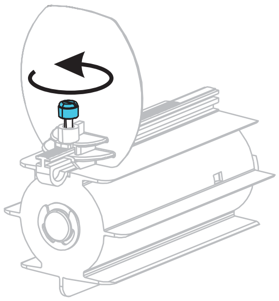
	Rewind Option	Liner Take-Up Option
5-b.	Feed the liner under the media alignment roller (**1**).	Slide the liner into the slot in the liner take-up spindle (**1**).



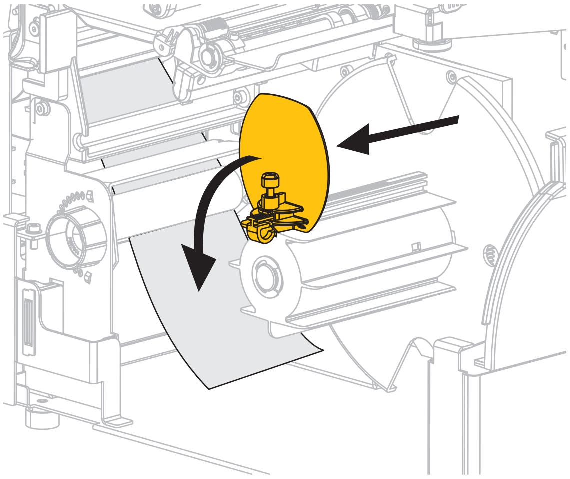


Rewind Option (Continued)

5-c. Loosen the thumbscrew on the rewind media guide.

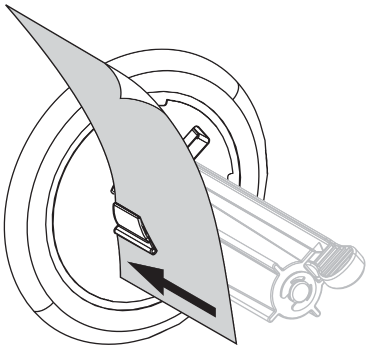


5-d. Slide the rewind media guide all the way out, and then fold it down.

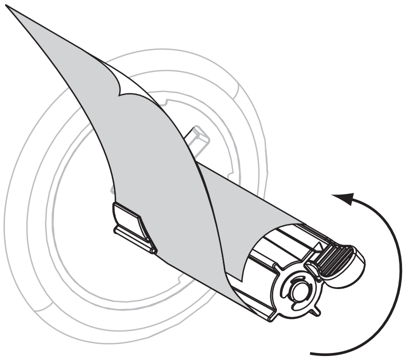


Liner Take-Up Option (Continued)

Push the liner back until it touches the back plate of the liner take-up spindle assembly.



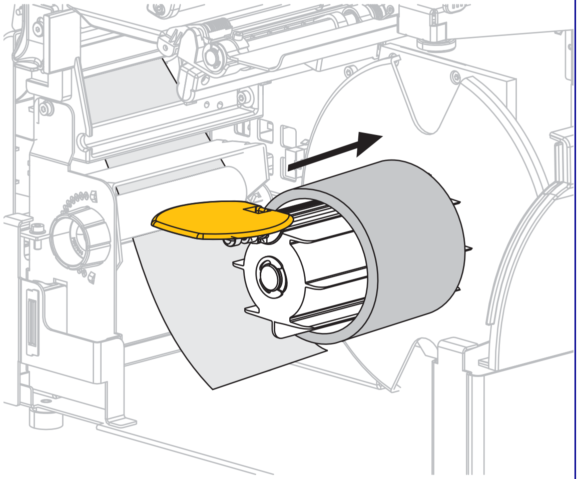
Wrap the liner around the liner take-up spindle and turn the spindle counterclockwise to tighten the liner.



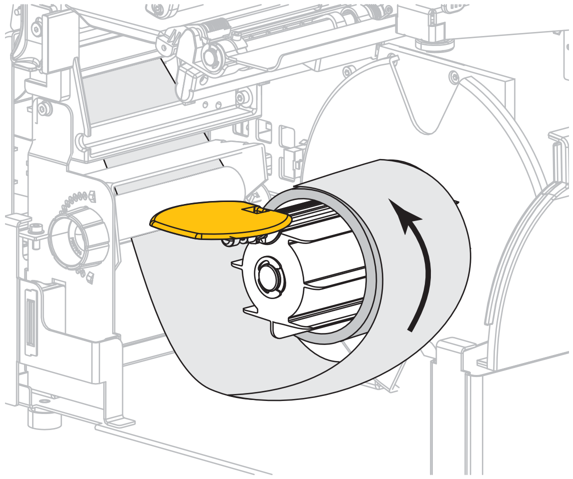
For the Liner Take-Up option, loading of the liner is complete. Continue with step 6.

Rewind Option (Continued)

5-e. Slide an empty core onto the rewind spindle.

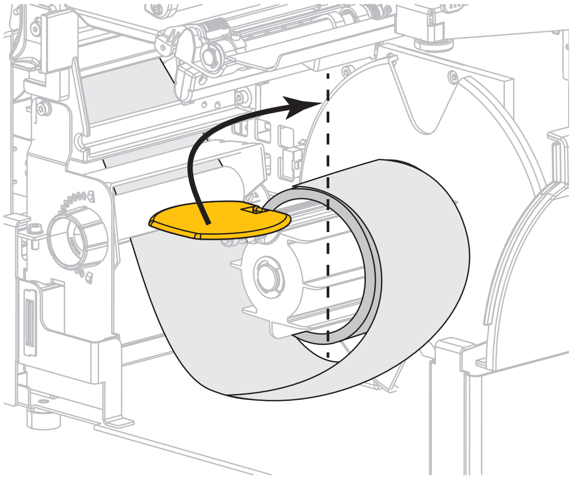


5-f. Wrap the liner around the core as shown, and then turn the rewind spindle to tighten the media. Ensure that the edge of the media is flush against the backplate of the rewind spindle.

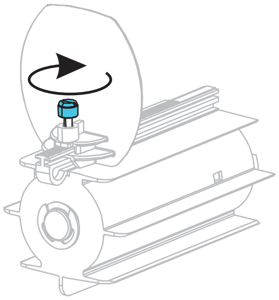


Rewind Option (Continued)

5-g. Fold up the rewind media guide, and then slide it in until it touches the liner.



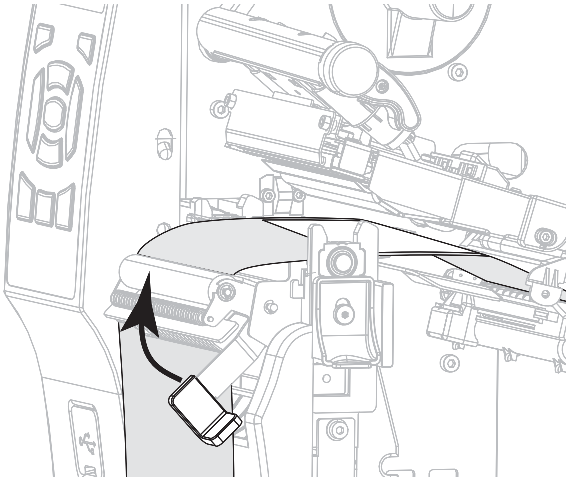
5-h. Tighten the thumbscrew on the rewind media guide.



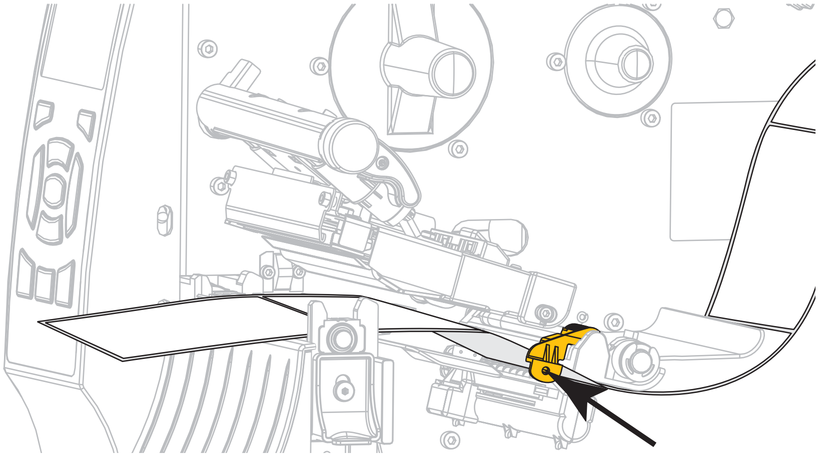
5-i. Loading of the liner is complete. Continue with step 6.

6. **Caution •** Use the peel release lever and your right hand to close the peel assembly. Do not use your left hand to assist in closing. The top edge of the peel roller/assembly could pinch your fingers.

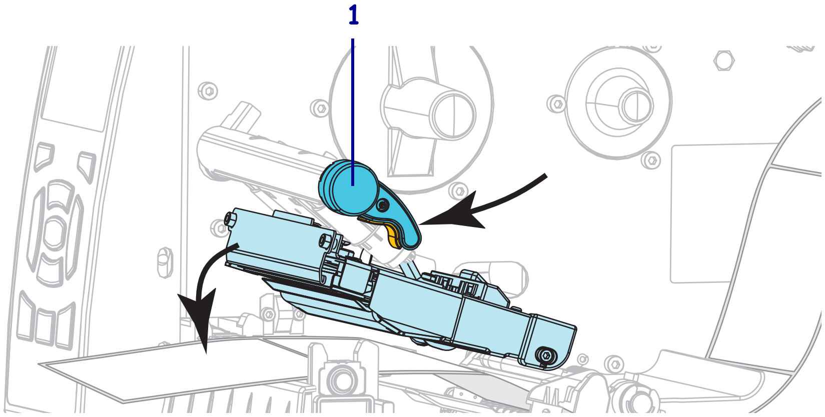
Close the peel assembly using the peel-off mechanism release lever.



7. Slide in the media guide until it just touches the edge of the media.



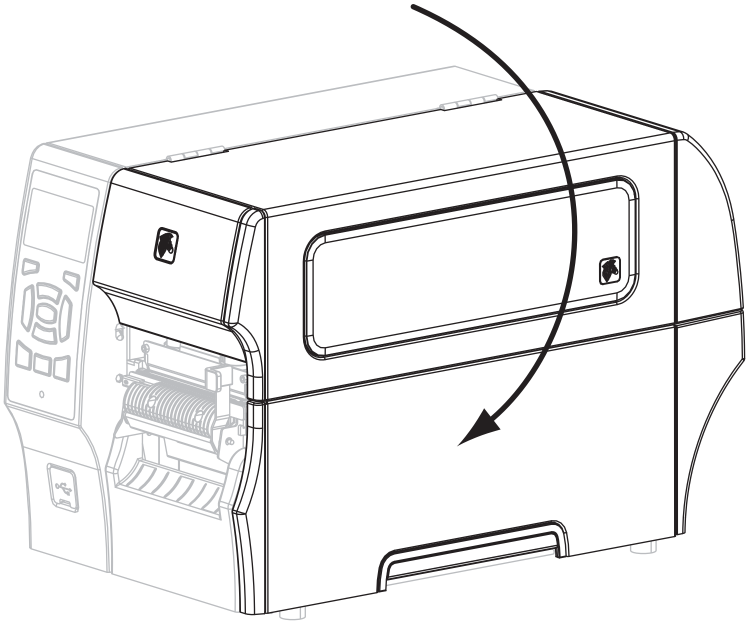
8. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



9. Does the media that you are using require ribbon for printing? If you are not sure, see *When to Use Ribbon* on page 18.

If using…	Then…
Direct Thermal media (no ribbon needed)	Continue with step 10.
Thermal Transfer media (ribbon needed)	**a.** If you have not already done so, load ribbon in the printer. See *Load the Ribbon* on page 60. **b.** Continue with step 10.

10. Close the media door.



11. Set the printer to Peel-Off mode (for more information, see *Print Mode* on page 69).

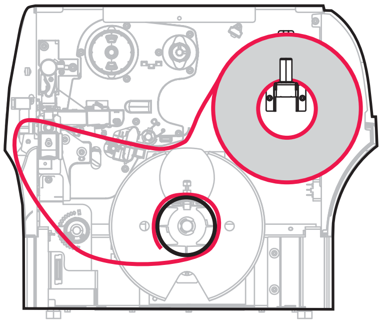
12. Press PAUSE to exit pause mode and enable printing.

    The printer may perform a label calibration or feed a label, depending on your settings.

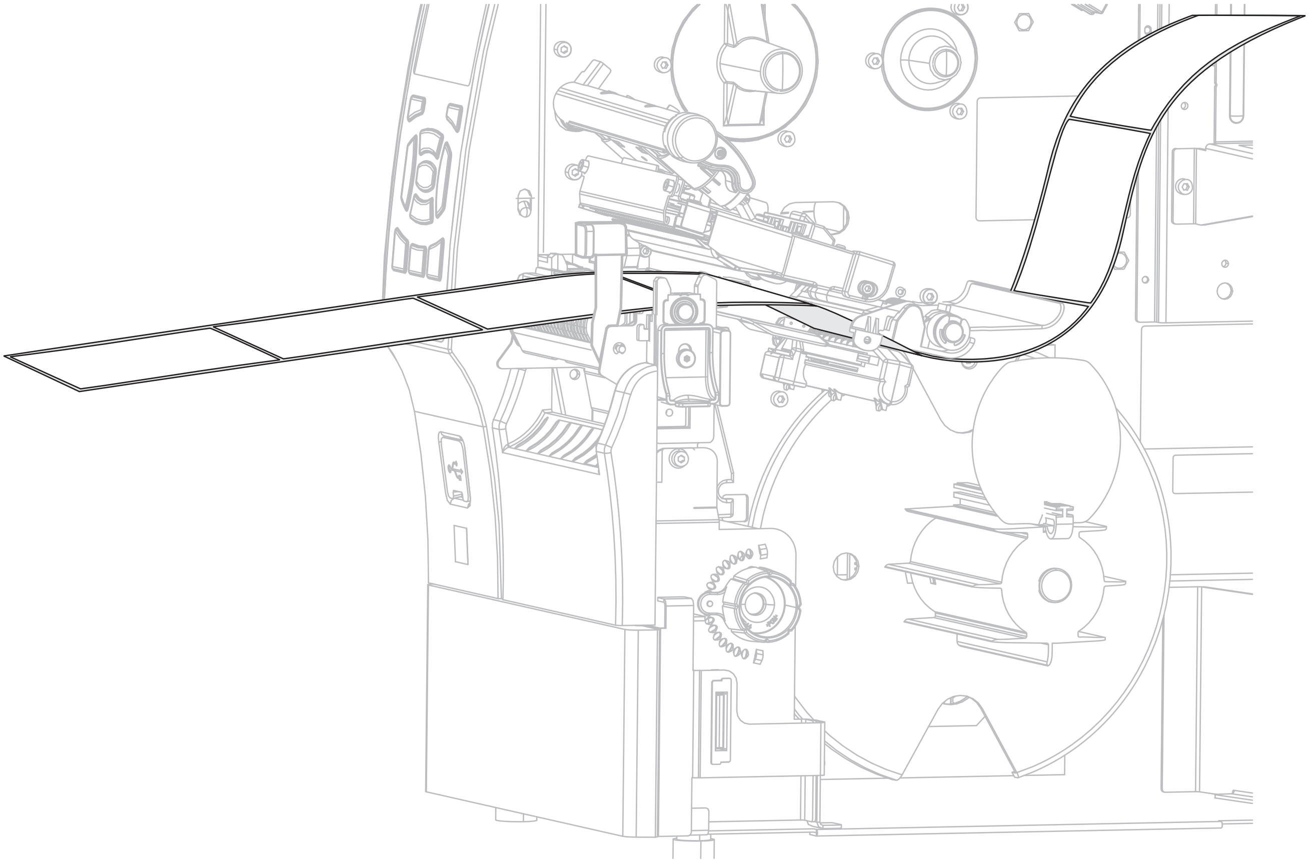
13. If desired, perform the *CANCEL Self Test* on page 163 to verify that your printer is able to print.

    Media loading in Peel-Off mode is complete.

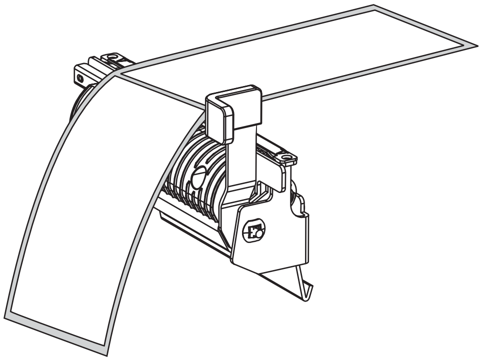
Final Steps for Rewind Mode



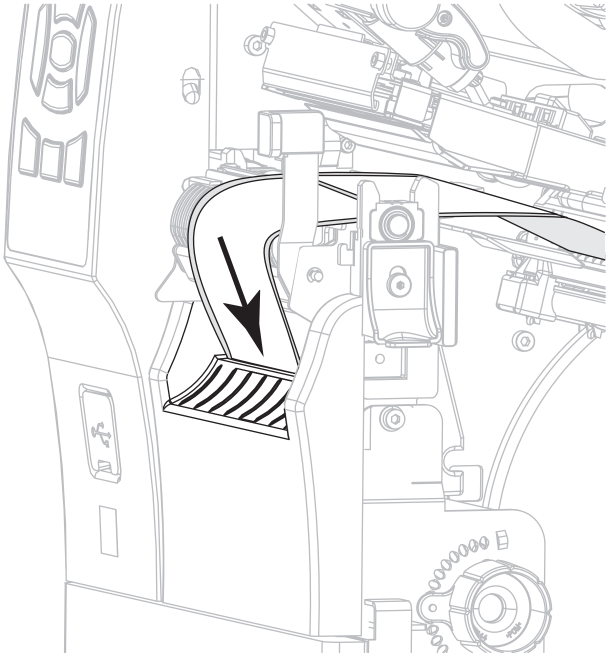
1. Extend the media approximately 18 in. (500 mm) out of the printer.



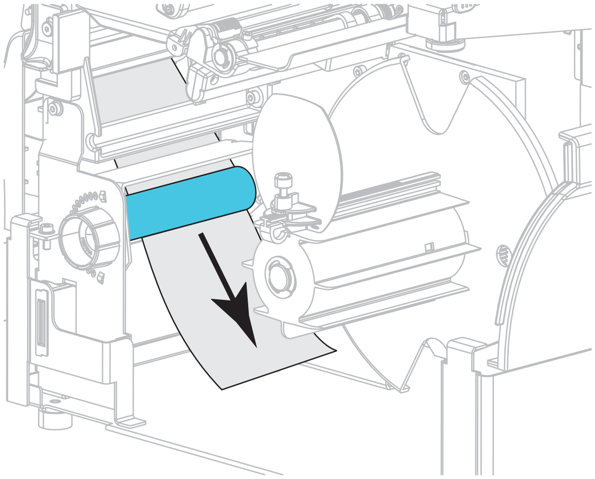
2. Feed the media over the peel assembly.



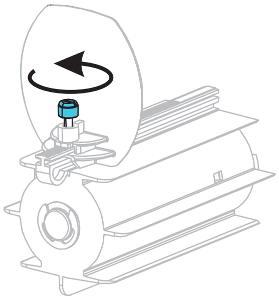
3. Thread the media into the slot below the peel assembly.



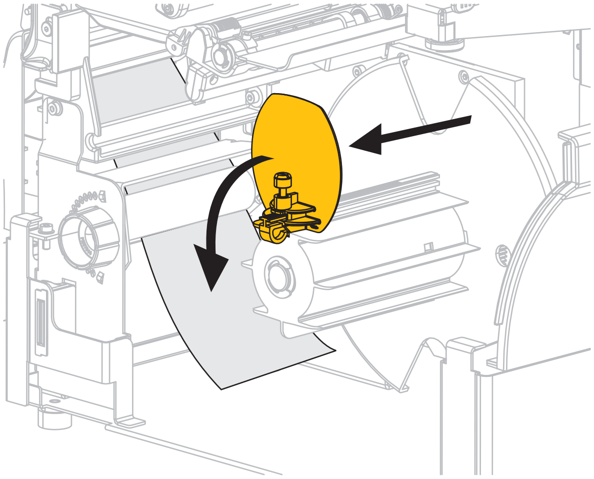
4. Feed the media under the media alignment roller.



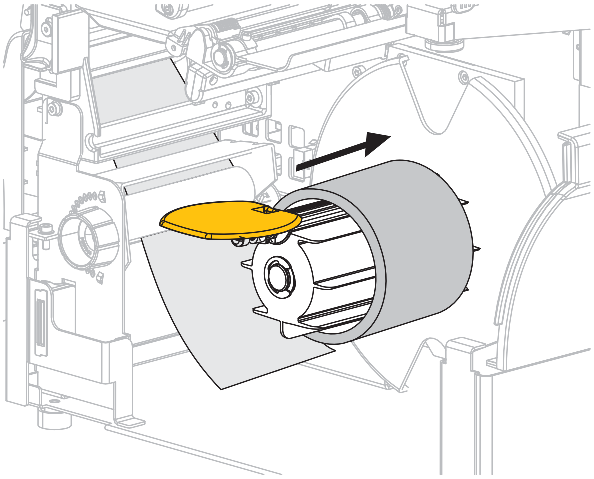
5. Loosen the thumbscrew on the rewind media guide.



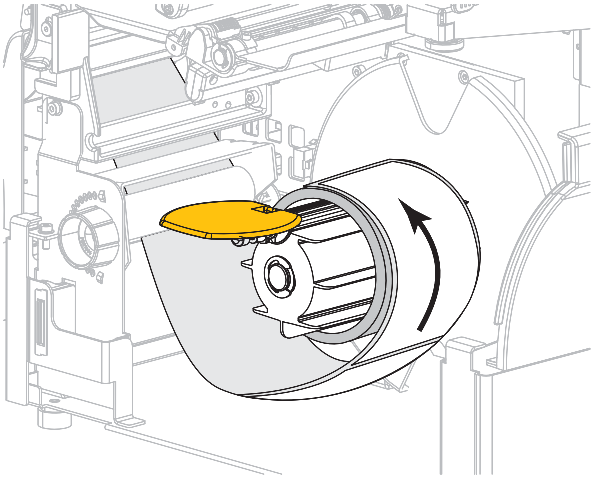
6. Slide the rewind media guide all the way out, and then fold it down.



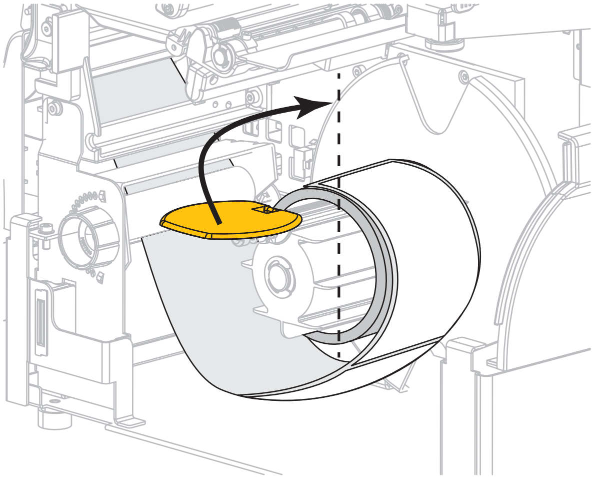
7. Slide an empty core onto the rewind spindle.



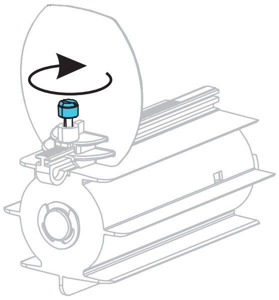
8. Wrap the media around the core as shown and turn the rewind spindle to tighten the media. Ensure that the edge of the media is flush against the backplate of the rewind spindle.



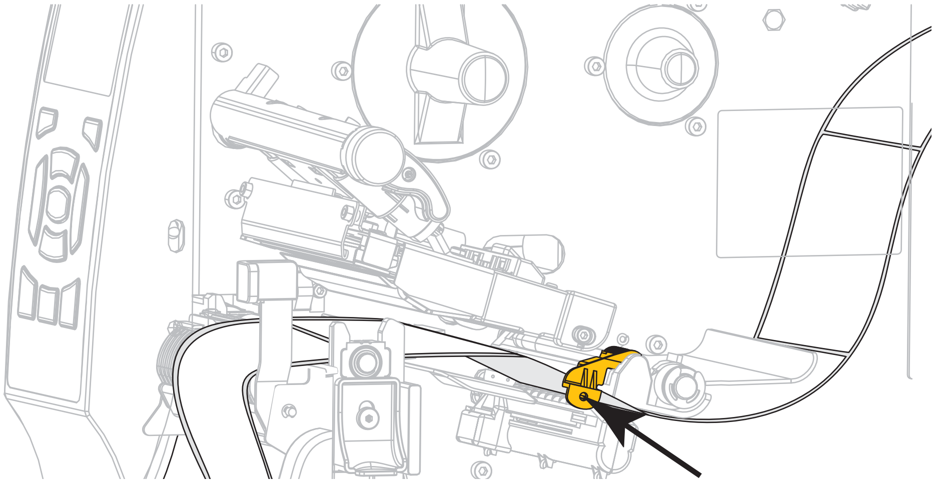
9. Fold up the rewind media guide, and then slide it in until it touches the media.



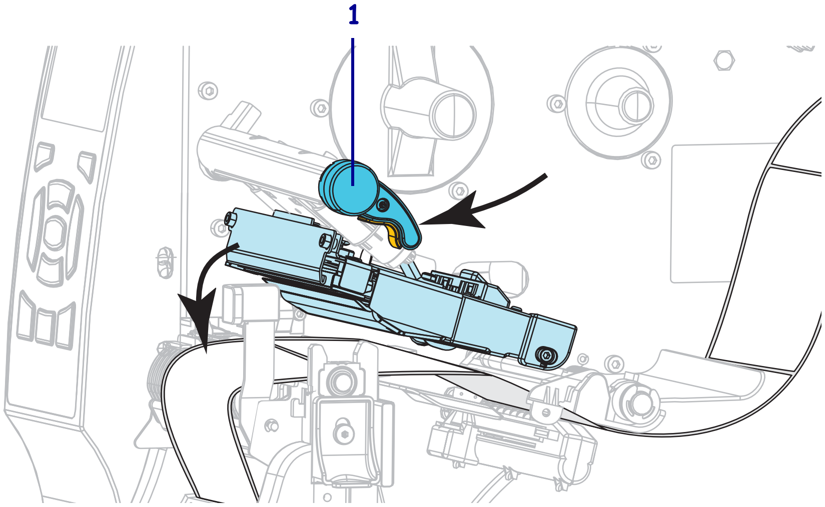
10. Tighten the thumbscrew on the rewind media guide.



11. Slide in the outer media guide until it just touches the edge of the media.



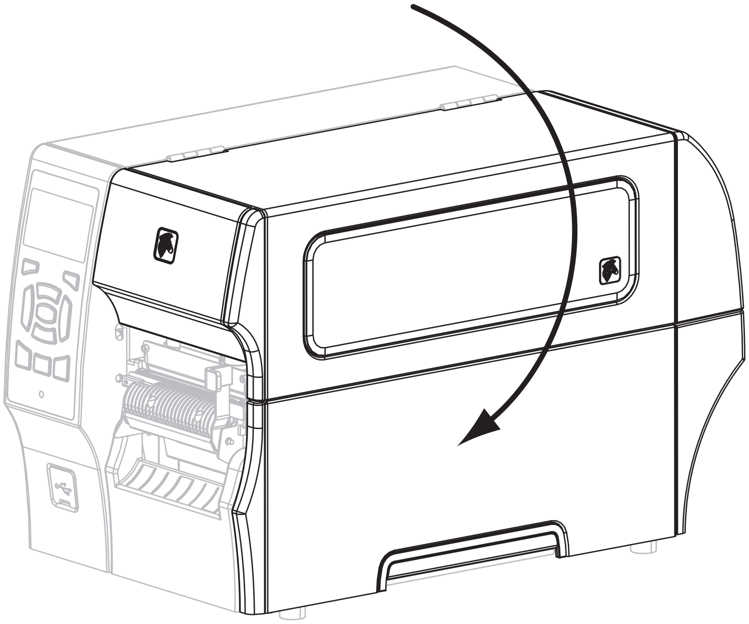
12. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



13. Does the media that you are using require ribbon for printing? If you are not sure, see *When to Use Ribbon* on page 18.

If using…	**Then…**
Direct Thermal media (no ribbon needed)	Continue with step 14.
Thermal Transfer media (ribbon needed)	**a.** If you have not already done so, load ribbon in the printer. See *Load the Ribbon* on page 60. **b.** Continue with step 14.

14. Close the media door.



15. Set the printer to Rewind mode (for more information, see *Print Mode* on page 69).

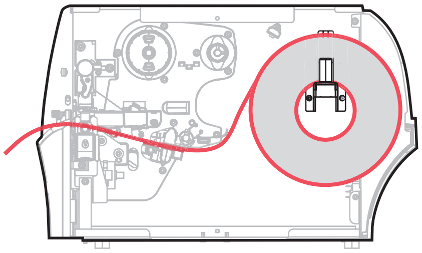
16. Press PAUSE to exit pause mode and enable printing.

    The printer may perform a label calibration or feed a label, depending on your settings.

17. If desired, perform the *CANCEL Self Test* on page 163 to verify that your printer is able to print.

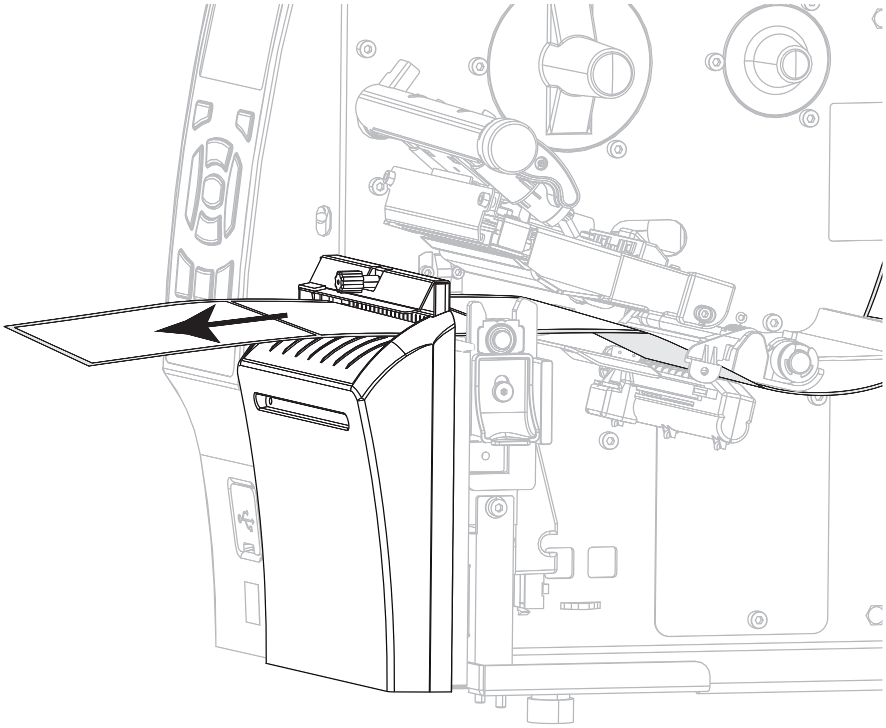
    Media loading in Cutter mode is complete.

Final Steps for Cutter Mode

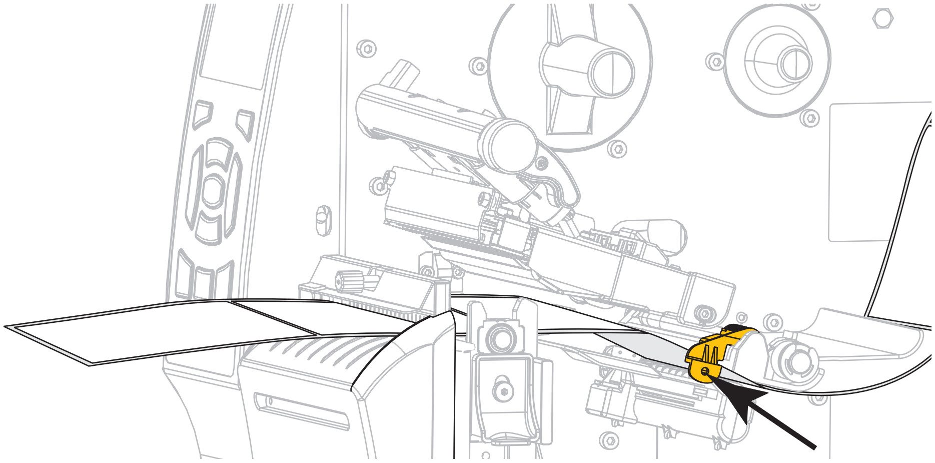


1. **Caution •** The cutter blade is sharp. Do not touch or rub the blade with your fingers.

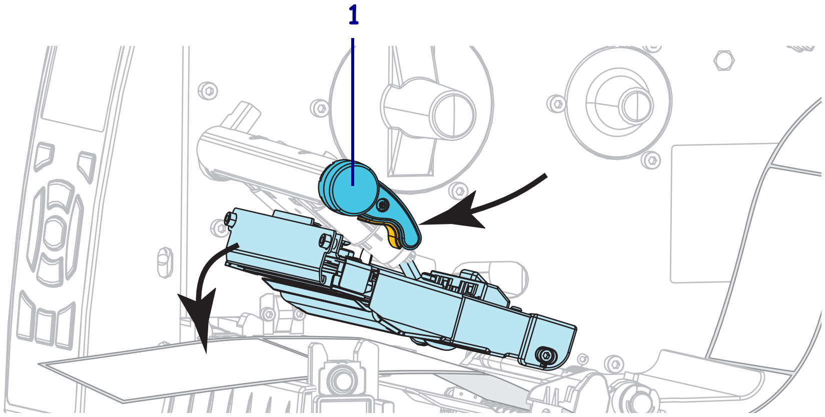
Feed the media through the cutter.



2. Slide in the outer media guide until it just touches the edge of the media.



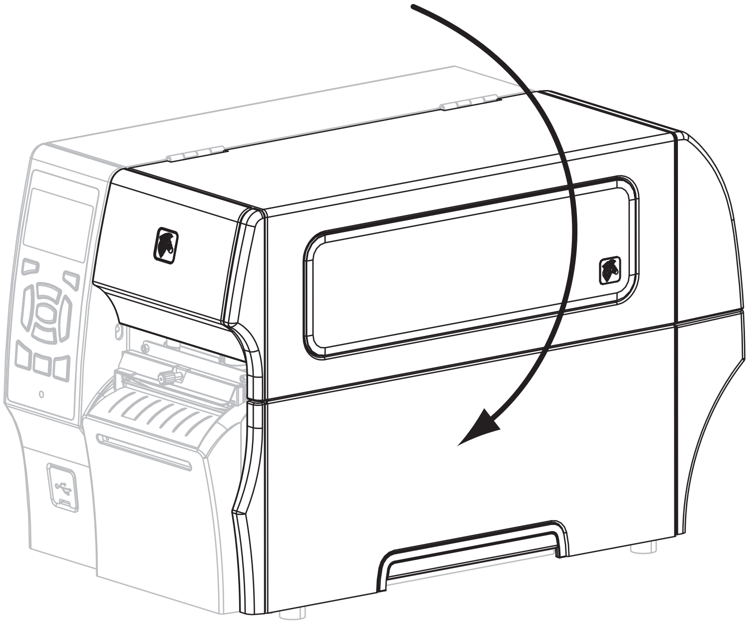
3. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



4. Does the media that you are using require ribbon for printing? If you are not sure, see *When to Use Ribbon* on page 18.

If using…	**Then…**
Direct Thermal media (no ribbon needed)	Continue with step 5.
Thermal Transfer media (ribbon needed)	**a.** If you have not already done so, load ribbon in the printer. See *Load the Ribbon* on page 60. **b.** Continue with step 5.

5. Close the media door.



6. Set the printer to Cutter mode (for more information, see *Print Mode* on page 69).
7. Press PAUSE to exit pause mode and enable printing.

   The printer may perform a label calibration or feed a label, depending on your settings.
8. If desired, perform the *CANCEL Self Test* on page 163 to verify that your printer is able to print.

   Media loading in Cutter mode is complete.

Load the Ribbon

Note • This section applies only to printers that have the Thermal Transfer option installed.

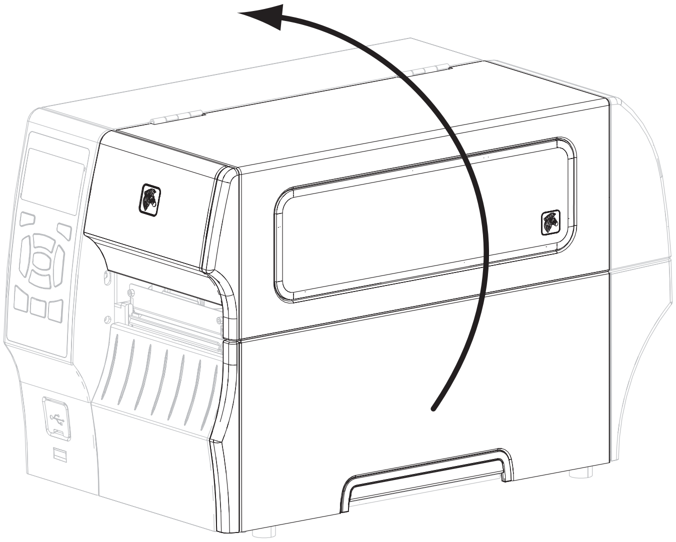
Ribbon is used only with thermal transfer labels. For direct thermal labels, do not load ribbon in the printer. To determine if ribbon must be used with a particular media, see *When to Use Ribbon* on page 18.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

Important • Use ribbon that is wider than the media to protect the printhead from wear. Ribbon must be coated on the outside.

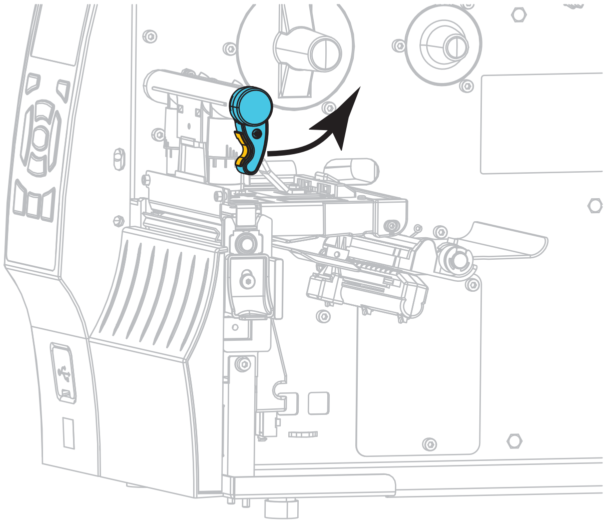
To load ribbon, complete these steps:

1. Raise the media door.

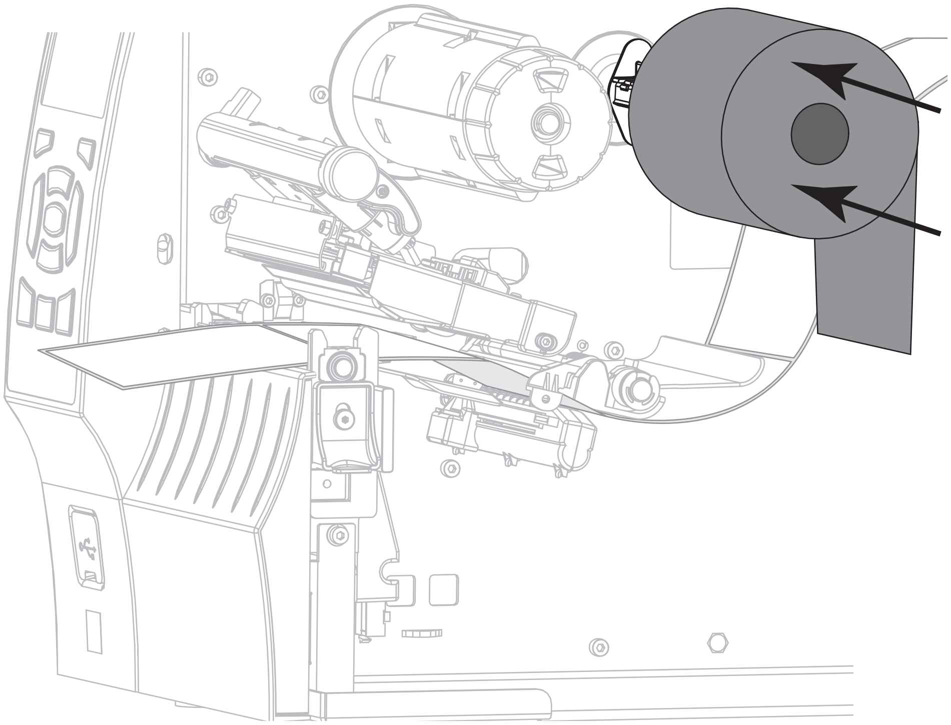


2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

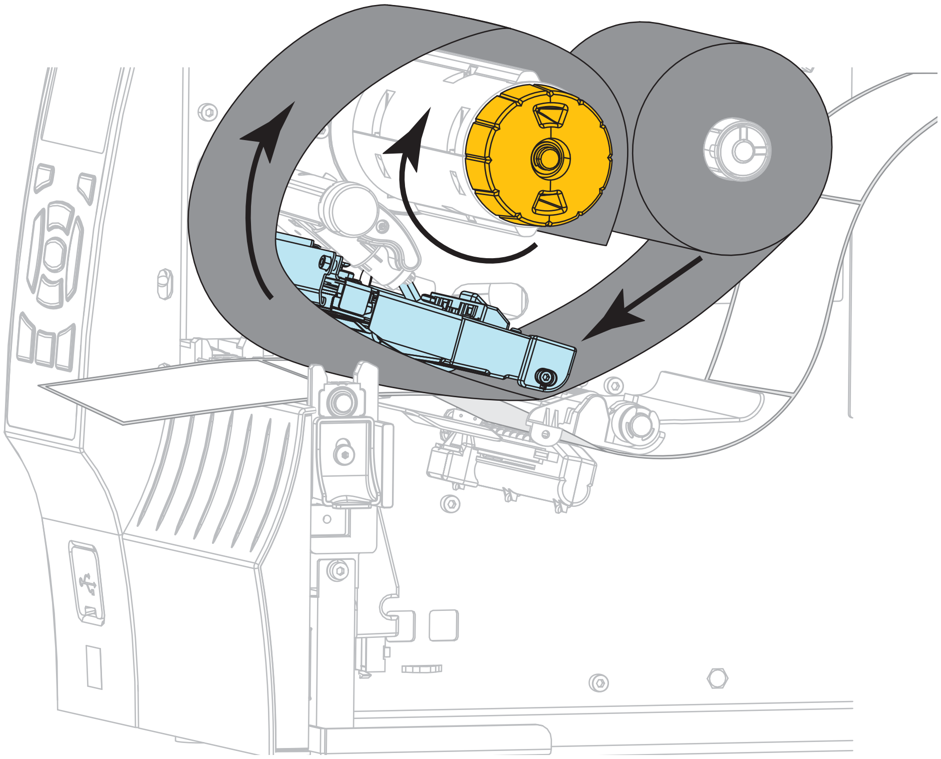
   Open the printhead assembly by rotating the printhead-open lever.



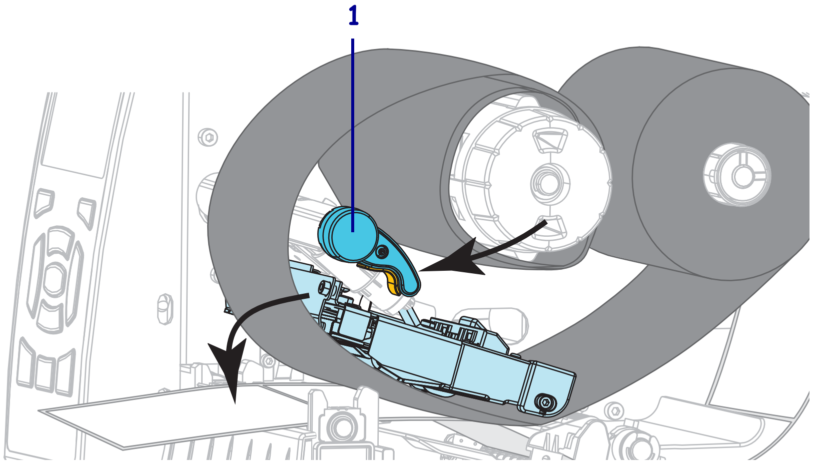
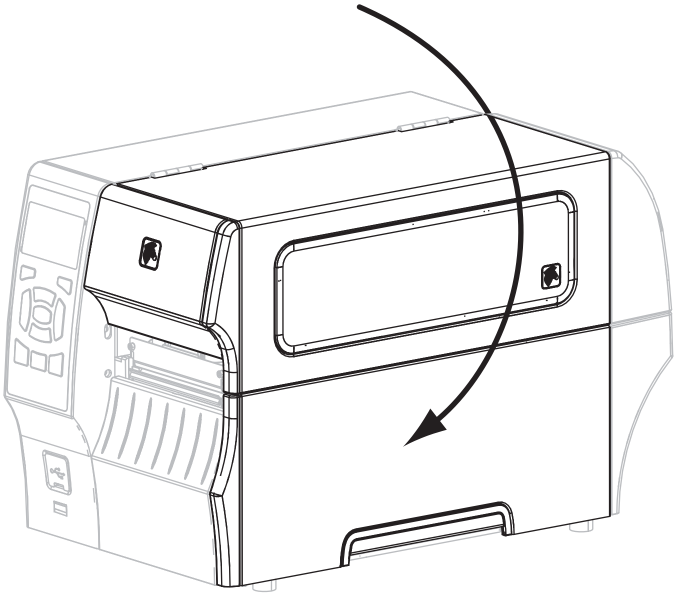
3. Place the roll of ribbon on the ribbon supply spindle with the loose end of the ribbon unrolling as shown. Push the roll back as far as it will go.



4. Bring the ribbon under the printhead assembly, and then wrap it several turns around the ribbon take-up spindle.



5. Is media already loaded in the printer?

If...	**Then...**
No	Continue with step 3 on page 35 to load media in the printer.
Yes	**a.** Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.  **b.** Close the media door.  **c.** If necessary, press PAUSE to enable printing.

Notes •

3

Printer Configuration and Adjustment

This section assists you with configuration of and adjustments to the printer.

Contents

- Adjust Printer Settings 66
  - Print Settings 67
  - Calibration and Diagnostic Tools 71
  - Network Settings 77
  - RFID Settings. 80
  - Language Settings 83
  - Sensor Settings 86
  - Port Settings 87
  - BlueTooth Settings 89
- User Menus 90
  - Navigating through Screens in the Display 90
  - SETTINGS Menu 94
  - TOOLS Menu 97
  - NETWORK Menu. 102
  - RFID Menu. 108
  - LANGUAGE Menu 111
  - SENSORS Menu 113
  - PORTS Menu. 115
  - BLUETOOTH Menu 117
- Calibrate the Ribbon and Media Sensors 119
- Adjust the Printhead Pressure 124
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Adjust Printer Settings

This section presents the printer settings that you can change and identifies the tools for changing them. These tools include the following:

- ZPL and Set/Get/Do (SGD) commands (See the *Zebra® Programming Guide* for more information.)
- The printer's **user menus** (See *User Menus* on page 90 for more information.)
- The printer's **web pages** when the printer has an active wired or wireless print server connection (See the *ZebraNet Wired and Wireless Print Servers User Guide* for more information.)

Copies of the referenced manuals are available at http://www.zebra.com/manuals.

This section contains the following subsections:

- *Print Settings* on page 67
- *Calibration and Diagnostic Tools* on page 71
- *Network Settings* on page 77
- *RFID Settings* on page 80
- *Language Settings* on page 83
- *Sensor Settings* on page 86
- *Port Settings* on page 87
- *BlueTooth Settings* on page 89

Print Settings

Table 1 • Print Settings

Print Darkness	Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. If desired, use the *FEED Self Test* on page 165 to determine the best darkness setting.	
	Accepted values:	0.0 – 30.0
	Related ZPL command(s):	`^MD`, `~SD`
	SGD command used:	`print.tone`
	User menu item:	DARKNESS on page 94
	Printer web page:	View and Modify Printer Settings > General Setup > Darkness
Print Speed	Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality.	
	Accepted values:	2, 3, 4, 5, 6
	Related ZPL command(s):	`^PR`
	SGD command used:	`media.speed`
	User menu item:	PRINT SPEED on page 94
	Printer web page:	N/A
Media Type	Select the type of media that you are using. • If you select CONTINUOUS, you must include a label length in your label format (`^LL` if you are using ZPL). • If you select GAP/NOTCH or MARK for various non-continuous media, the printer feeds media to calculate the label length. See *Types of Media* on page 16 for more information.	
	Accepted values:	• CONTINUOUS • GAP/NOTCH • MARK
	Related ZPL command(s):	`^MN`
	SGD command used:	`ezpl.media_type`
	User menu item:	MEDIA TYPE on page 94
	Printer web page:	View and Modify Printer Settings > Media Setup > Media Type

Table 1 • Print Settings (Continued)

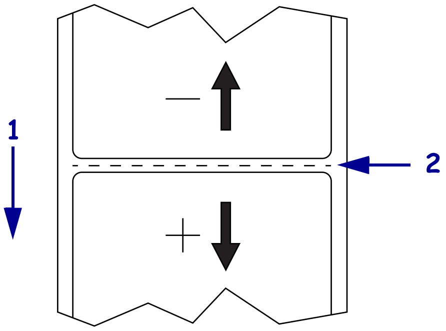
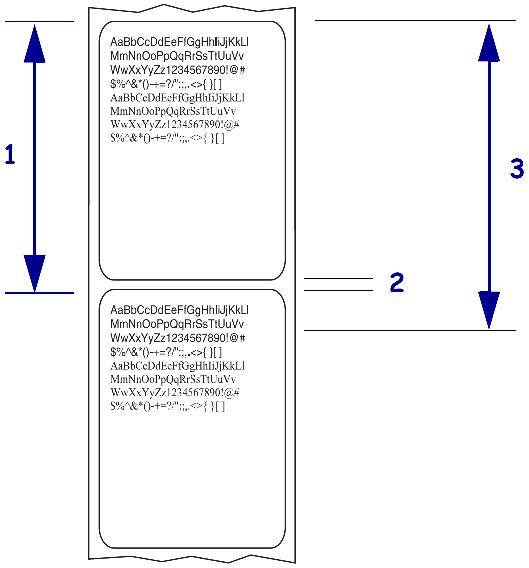
Print Method	Specify if the printer is to use Direct Thermal mode (no ribbon) or Thermal Transfer mode (using thermal transfer media and ribbon).	
	Accepted values:	• THERMAL TRANS • DIRECT THERMAL
	Related ZPL command(s):	`^MT`
	SGD command used:	`ezpl.print_method`
	User menu item:	PRINT METHOD on page 94
	Printer web page:	View and Modify Printer Settings > Media Setup > Print Method
Tear-Off Position	If necessary, adjust the position of the media over the tear-off bar after printing. • Higher numbers move the media out (the tear line moves closer to the leading edge of the next label). • Lower numbers move the media in (the tear line moves closer to the edge of the label just printed).  **1** Media direction **2** Factory-set tear line location at position 000	
	Accepted values:	–120 to 120
	Related ZPL command(s):	`~TA`
	SGD command used:	`ezpl.tear_off`
	User menu item:	TEAR OFF on page 95
	Printer web page:	View and Modify Printer Settings > General Setup > Tear Off

Table 1 • Print Settings (Continued)

Print Width	Specify the width of the labels being used. The default value is the maximum width for the printer, based on the printhead's DPI value. **Note •** Setting the width too narrow can result in portions of a label format not being printed on the media. Setting the width too wide wastes formatting memory and can cause the printer to print off of the label and onto the platen roller. This setting can affect the horizontal position of the label format if the image was inverted using the `^POI` ZPL II command.	
	Accepted values:	ZT410 203 dpi = 0002 to 832 ZT410 300 dpi = 0002 to 1248 ZT410 600 dpi = 0002 to 2496 ZT420 203 dpi = 0002 to 1344 ZT420 300 dpi = 0002 to 1984
	Related ZPL command(s):	`^PW`
	SGD command used:	`ezpl.print_width`
	User menu item:	PRINT WIDTH on page 95
	Printer web page:	View and Modify Printer Settings > Media Setup > Print Width
Print Mode	Select a print mode that is compatible with your printer options. For information about how the print mode selections work with different printer options, see *Select a Print Mode* on page 30.	
	Accepted values:	• TEAR OFF • CUTTER • PEEL (use this value for peel-off or liner take-up printing)
	Related ZPL command(s):	`^MM`
	SGD command used:	`media.printmode`
	User menu item:	PRINT MODE on page 95
	Printer web page:	View and Modify Printer Settings > General Setup > Print Mode
Label Left Position	If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.	
	Accepted values:	–9999 to 9999
	Related ZPL command(s):	`^LS`
	SGD command used:	`zpl.left_position`
	User menu item:	LEFT POSITION on page 95
	Printer web page:	View and Modify Printer Settings > Advanced Setup > Left Position

Table 1 • Print Settings (Continued)

<table>
<tr><td rowspan="6">Reprint Mode</td><td colspan="2">When reprint mode is enabled, you can reprint the last label printed by pressing and holding PAUSE + CANCEL on the printer’s control panel.</td></tr>
<tr><td><i>Accepted values:</i></td><td>• ON
• OFF</td></tr>
<tr><td><i>Related ZPL command(s):</i></td><td><code>^JZ</code></td></tr>
<tr><td><i>SGD command used:</i></td><td><code>ezpl.reprint_mode</code></td></tr>
<tr><td><i>User menu item:</i></td><td>REPRINT MODE on page 95</td></tr>
<tr><td><i>Printer web page:</i></td><td>N/A</td></tr>
<tr><td rowspan="6">Maximum Label Length</td><td colspan="2">Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.
For example, if the label length is 6.0 inches (152 mm) including the interlabel gap, set the parameter for at least 7.0 inches (178 mm).


<table><tr><td>1</td><td>Label length (including interlabel gap)</td></tr><tr><td>2</td><td>Interlabel gap</td></tr><tr><td>3</td><td>Set the maximum label length to approximately this value</td></tr></table></td></tr>
<tr><td><i>Accepted values:</i></td><td>0 to the maximum label length supported by the printer</td></tr>
<tr><td><i>Related ZPL command(s):</i></td><td><code>^ML</code></td></tr>
<tr><td><i>SGD command used:</i></td><td><code>ezpl.label_length_max</code></td></tr>
<tr><td><i>User menu item:</i></td><td>LABEL LENGTH MAX on page 96</td></tr>
<tr><td><i>Printer web page:</i></td><td>View and Modify Printer Settings > Media Setup > Maximum Length</td></tr>
</table>

Calibration and Diagnostic Tools

Table 2 • Calibration and Diagnostic Tools

Print Information	Print the specified information on one or more labels.	
	Accepted values:	• SETTINGS—prints the printer configuration label. • NETWORK—prints the settings for any print server that is installed. • FORMATS—prints the available formats stored in the printer's RAM, Flash memory, or optional memory card. • IMAGES—prints the available images stored in the printer's RAM, Flash memory, or optional memory card. • FONTS—prints the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory. • BARCODES—prints the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory. • ALL—prints the previous six labels. • SENSOR PROFILE—shows the sensor settings compared to actual sensor readings. To interpret the results of the sensor profile, see *Sensor Profile on page 170*.
	Related ZPL command(s):	Settings: `~WC` Network: `~WL` Sensor profile: `~JG` Others: `^WD`
	SGD command used:	none
	User menu item:	Settings: PRINT INFORMATION on page 97 Network: PRINT INFORMATION on page 106 Sensor profile: PRINT INFORMATION on page 113
	Control panel key(s):	Settings and Network: Do one of the following: • Hold CANCEL during printer power-up. • Hold FEED + CANCEL for 2 seconds when the printer is in the Ready state. Sensor profile: Hold FEED + CANCEL during printer power-up.
	Printer web page:	View and Modify Printer Settings > Print Listings on Label

Table 2 • Calibration and Diagnostic Tools (Continued)

LCD Contrast	Change the contrast on the printer's display.	
	Accepted values:	3 to 15
	Related ZPL command(s):	none
	SGD command used:	`display.contrast`
	User menu item:	LCD CONTRAST on page 97
	Printer web page:	N/A
Idle Display	Select the information shown on the printer's display when the printer is idle.	
	Accepted values:	• FW VERSION • IP ADDRESS • MM/DD/YY 24 HR • M/DD/YY 12 HR • DD/MM/YY 24 HR • DD/MM/YY 12 HR
	Related ZPL command(s):	none
	SGD command used:	`device.idle_display_format`
	User menu item:	IDLE DISPLAY on page 97
	Printer web page:	N/A
Power-Up Action	Set the action for the printer to take during the power-up sequence. • **CALIBRATE** adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web. • **FEED**—feeds the labels to the first registration point. • **LENGTH** determines the label length using current sensor values, and feeds the media to the next web. • **NO MOTION** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • **SHORT CAL** sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.	
	Accepted values:	• CALIBRATE • FEED • LENGTH • NO MOTION • SHORT CAL
	Related ZPL command(s):	`^MF`
	SGD command used:	`ezpl.power_up_action`
	User menu item:	POWER UP ACTION on page 97
	Printer web page:	View and Modify Printer Settings > Calibration

Table 2 • Calibration and Diagnostic Tools (Continued)

Head-Close Action	Set the action for the printer to take when you close the printhead. • **CALIBRATE** adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web. • **FEED**—feeds the labels to the first registration point. • **LENGTH** determines the label length using current sensor values, and feeds the media to the next web. • **NO MOTION** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • **SHORT CAL** sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.	
	Accepted values:	• CALIBRATE • FEED • LENGTH • NO MOTION • SHORT CAL
	Related ZPL command(s):	`^MF`
	SGD command used:	`ezpl.head_close_action`
	User menu item:	HEAD CLOSE ACTION on page 98
	Printer web page:	View and Modify Printer Settings > Calibration
Head-Open Light	Set the brightness of the light that turns on when the printhead is open.	
	Accepted values:	• HIGH • MEDIUM • LOW • OFF
	Related ZPL command(s):	N/A
	SGD command used:	`device.light.head_open_brightness`
	User menu item:	HEAD OPEN LIGHT on page 98
	Printer web page:	N/A
Cover-Open Light	Set the brightness of the light that turns on when the media door is open.	
	Accepted values:	• HIGH • MEDIUM • LOW • OFF
	Related ZPL command(s):	N/A
	SGD command used:	`device.light.cover_open_brightness`
	User menu item:	COVER OPEN LIGHT on page 98
	Printer web page:	N/A

Table 2 • Calibration and Diagnostic Tools (Continued)

Load Defaults	Restore specific printer, print server, and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually. • FACTORY—Restores all printer settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually. • NETWORK—Reinitializes the printer's wired or wireless print server. With a wireless print server, the printer will also reassociate with your wireless network. • LAST SAVED—Loads settings from the last permanent save.	
	Accepted values:	• FACTORY • NETWORK • LAST SAVED
	Related ZPL command(s):	Factory: `^JUF` Network: `^JUN` Last saved: `^JUR`
	SGD command used:	none
	User menu item:	LOAD DEFAULTS on page 106
	Control panel key(s):	Factory: Hold FEED + PAUSE during printer power-up to reset the printer parameters to factory values. Network: Hold CANCEL + PAUSE during printer power-up to reset the network parameters to factory values. Last saved: N/A
	Printer web page:	Factory: View and Modify Printer Settings > Restore Default Configuration Network: Print Server Settings > Reset Print Server Last saved: View and Modify Printer Settings > Restore Saved Configuration

Table 2 • Calibration and Diagnostic Tools (Continued)

Media and Ribbon Sensor Calibration	Calibrate the printer to adjust the sensitivity of the media and ribbon sensors. For complete instructions on how to perform a calibration procedure, see *Calibrate the Ribbon and Media Sensors* on page 119.	
	Accepted values:	N/A
	Related ZPL command(s):	`~JC`
	SGD command used:	`ezpl.manual_calibration`
	User menu item:	MEDIA/RIBBON CAL on page 98
	Control panel key(s):	Hold PAUSE + FEED + CANCEL for 2 seconds to initiate calibration.
	Printer web page:	The calibration procedure cannot be initiated through the web pages. See the following web page for settings that are set during sensor calibration: View and Modify Printer Settings > Calibration **Important •** Do not change these settings unless you are told to do so by Zebra Technical Support or by an authorized service technician.
Communication Diagnostics Mode	Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer. For more information, see *Communication Diagnostics Test* on page 169.	
	Accepted values:	• DISABLED • ENABLED
	Related ZPL command(s):	`~JD` to enable, `~JE` to disable
	SGD command used:	`device.diagnostic_print`
	User menu item:	DIAGNOSTIC MODE on page 99
	Control panel key(s):	Hold PAUSE + FEED for 2 seconds when the printer is in the Ready state.
	Printer web page:	N/A

Table 2 • Calibration and Diagnostic Tools (Continued)

Enable ZBI	Zebra Basic Interpreter (ZBI 2.0™) is a programming option that may be purchased for your printer. If you would like to purchase this option, contact your Zebra reseller for more information.	
	Accepted values:	N/A
	Related ZPL command(s):	none
	SGD command used:	`zbi.key` (identifies if the ZBI 2.0 option is enabled or disabled on the printer)
	User menu item:	ZBI ENABLED? on page 99
	Printer web page:	N/A
Run a ZBI Program	If you have ZBI installed, you may choose to run a ZBI program that you have downloaded to your printer.	
	Accepted values:	N/A
	Related ZPL command(s):	`^JI`, `~JI`
	SGD command used:	`zbi.control.run`
	User menu item:	RUN ZBI PROGRAM on page 99
	Printer web page:	Directory Listing
Stop a ZBI Program	If your printer is running a ZBI program, you may stop that program.	
	Accepted values:	N/A
	Related ZPL command(s):	`~JQ`
	SGD command used:	`zbi.control.terminate`
	User menu item:	STOP ZBI PROGRAM on page 99
	Printer web page:	Directory Listing

Network Settings

Table 3 • Network Settings

IP Address	View and, if necessary, change the printer’s IP address. Changes to this setting are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, reset the print server (see *Reset Network* on page 79).	
	Accepted values:	000 to 255 for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.addr` Wireless: `ip.addr`, `wlan.ip.addr`
	User menu item:	WIRED IP ADDRESS on page 102
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings
Subnet Mask	View and, if necessary, change the subnet mask. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see *Reset Network* on page 79).	
	Accepted values:	000 to 255 for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.netmask` Wireless: `wlan.ip.netmask`
	User menu item:	WIRED SUBNET MASK on page 102
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings
Gateway	View and, if necessary, change the default gateway. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see *Reset Network* on page 79).	
	Accepted values:	000 to 255 for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.gateway` Wireless: `wlan.ip.gateway`
	User menu item:	WIRED GATEWAY on page 103
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

Table 3 • Network Settings (Continued)

IP Protocol	This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. When a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.	
	Accepted values:	• ALL • GLEANING ONLY • RARP • BOOTP • DHCP • DHCP & BOOTP • PERMANENT
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.protocol` Wireless: `wlan.ip.protocol`
	User menu item:	WIRED IP PROTOCOL on page 103
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings
MAC Address	View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).	
	Accepted values:	N/A
	Related ZPL command(s):	none
	SGD command used:	Wired: `internal_wired.mac_addr` Wireless: `wlan.mac_addr`
	User menu item:	WIRED MAC ADDRESS on page 103
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
ESSID	The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.	
	Accepted values:	32-character alphanumeric string (default 125)
	Related ZPL command(s):	none
	SGD command used:	`wlan.essid`
	User menu item:	ESSID on page 105
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup

Table 3 • Network Settings (Continued)

Channel	View the wireless channel being used when the wireless network is active and authenticated.	
	Accepted values:	N/A
	Related ZPL command(s):	none
	SGD command used:	`wlan.channel`
	User menu item:	CHANNEL on page 105
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
Signal	View the wireless signal strength when the wireless network is active and authenticated.	
	Accepted values:	N/A
	Related ZPL command(s):	none
	SGD command used:	`wlan.signal_strength`
	User menu item:	SIGNAL on page 105
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
Reset Network	This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.	
	Accepted values:	N/A
	Related ZPL command(s):	`~WR`
	SGD command used:	`device.reset`
	User menu item:	RESET NETWORK on page 106
	Printer web page:	Print Server Settings > Factory Print Server Settings

RFID Settings

Table 4 • RFID Settings

RFID Status	Display the status of the RFID subsystem of the printer.	
	Accepted values:	N/A
	Related ZPL command(s):	`^HL` or `~HL`
	SGD command used:	`rfid.error.response`
	User menu item:	RFID STATUS on page 108
	Printer web page:	N/A
Read RFID Data	Read and return the specified tag data from the RFID tag located over the RFID antenna. No printer movement occurs while tag data is being read. The printhead can be open or closed.	
	Accepted values:	`epc` = reads the first 128 bits of EPC data `tid information` = reads the first 32 bits of the TID (Tag ID) `password status` = reads the tag's access and kill passwords `protocol bits` = reads the protocol bits from the EPC memory banks and converts that value to the EPC size `memory bank sizes` = reads the EPC, TID, and user memory banks sizes
	Related ZPL command(s):	`^RF`
	SGD command used:	`rfid.tag.read.content` and `rfid.tag.read.execute`
	User menu item:	READ RFID DATA on page 108
	Printer web page:	N/A
RFID Test	During the RFID test, the printer attempts to read and write to a transponder. No printer movement occurs with this test.	
	Accepted values:	`quick` = performs a read EPC test and a write EPC test (using random data) `read` = performs a read EPC test `write` = performs a write EPC test (using random data)
	Related ZPL command(s):	N/A
	SGD command used:	`rfid.tag.test.content` and `rfid.tag.test.execute`
	User menu item:	RFID TEST on page 109
	Printer web page:	N/A

Table 4 • RFID Settings (Continued)

Programming Position	If the desired programming position (read/write position) is not achieved through RFID tag calibration, a value may be specified. See the *RFID Programming Guide 3* for more information.	
	Accepted values:	`F0` to `Fxxx` (where `xxx` is the label length in millimeters or `999`, whichever is less) The printer feeds the label forward for the specified distance and then begins programming. `B0` to `B30` The printer backfeeds the label for the specified distance and then begins programming. To account for the backfeed, allow empty media liner to extend out of the front of the printer when using a backward programming position.
	Related ZPL command(s):	`^RS`
	SGD command used:	`rfid.position.program`
	User menu item:	RFID PROGRAM POS. on page 109
	Printer web page:	View and Modify Printer Settings > RFID Setup > PROGRAM POSITION
RFID Antenna Element	If the desired antenna is not achieved through RFID tag calibration, a value may be specified. **Note •** This parameter does not apply to ZD500R printers, which always use an antenna element value of A1.	

	Accepted values:	`A1`, `A2`, `A3`, `A4`
		`B1`, `B2`, `B3`, `B4`
		`C1`, `C2`, `C3`, `C4`
		`D1`, `D2`, `D3`, `D4`
		`E1`, `E2`, `E3`, `E4`

	Related ZPL command(s):	`^RW`
	SGD command used:	`rfid.reader_1.antenna_port`
	User menu item:	RFID ANTENNA on page 109
	Printer web page:	View and Modify Printer Settings > RFID Setup > RFID ANTENNA

Table 4 • RFID Settings (Continued)

RFID Read Power	If the desired read power is not achieved through RFID tag calibration, a value may be specified.	
	Accepted values:	`0` to `30`
	Related ZPL command(s):	`^RW`
	SGD command used:	`rfid.reader_1.power.read`
	User menu item:	RFID READ POWER on page 109
	Printer web page:	View and Modify Printer Settings > RFID Setup > RFID READ PWR
RFID Write Power	If the desired write power is not achieved through RFID tag calibration, a value may be specified.	
	Accepted values:	`0` to `30`
	Related ZPL command(s):	`^RW`
	SGD command used:	`rfid.reader_1.power.write`
	User menu item:	RFID WRITE POWER on page 109
	Printer web page:	View and Modify Printer Settings > RFID Setup > RFID WRITE PWR
RFID Valid Counter	Resets the RFID valid label counter to zero.	
	Accepted values:	N/A
	Related ZPL command(s):	`~RO`
	SGD command used:	`odometer.rfid.valid_resettable`
	User menu item:	RFID VALID COUNT on page 110
	Printer web page:	N/A
RFID Void Counter	Resets the RFID void label counter to zero.	
	Accepted values:	N/A
	Related ZPL command(s):	`~RO`
	SGD command used:	`odometer.rfid.void_resettable`
	User menu item:	RFID VOID COUNT on page 110
	Printer web page:	N/A
RFID Tag Calibration	Initiate tag calibration for RFID media. (Not the same as media and ribbon calibration.)	
	Accepted values:	N/A
	Related ZPL command(s):	`^HR`
	SGD command used:	`rfid.tag.calibrate`
	User menu item:	RFID CALIBRATE on page 108
	Printer web page:	N/A

Language Settings

Table 5 • Language Settings

Language	If necessary, change the language that the printer displays. This change affects the words shown on the following: • the Home menu • the user menus • error messages • the printer configuration label, the network configuration label, and other labels that you can select to print through the user menus **Note •** The selections for this parameter are displayed in their native languages.	
	Accepted values:	ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, CZECH, JAPANESE, KOREAN, ROMANIAN, RUSSIAN, POLISH, SIMPLIFIED CHINESE, TRADITIONAL CHINESE
	Related ZPL command(s):	`^KL`
	SGD command used:	`display.language`
	User menu item:	(SETTINGS menu) LANGUAGE on page 96 (LANGUAGE menu) LANGUAGE on page 111
	Printer web page:	View and Modify Printer Settings > General Setup > Language
ZPL Override	Enable this menu item to prevent the following ZPL commands from changing the printer's current settings: • `^MM` (print mode) • `^MT` (Direct Thermal or Thermal Transfer print method) • `^MN` (media type non-continuous or continuous) When this menu item is disabled, these commands override the printer's settings.	
	Accepted values:	• DISABLED • ENABLED
	Related ZPL command(s):	none
	SGD command used:	`zpl.zpl_override`
	User menu item:	ZPL OVERRIDE on page 111
	Printer web page:	none

Table 5 • Language Settings (Continued)

Command Character	The format command prefix is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this hex character to indicate the start of a ZPL/ZPL II format instruction. Set the format command character to match what is used in your label formats. ! **Important •** You cannot use the same hex value for the format command prefix, control character, and delimiter characters. The printer must see different characters to work properly. If you are setting the value through the control panel, the printer will skip any value that is already in use.	
	Accepted values:	00 to FF
	Related ZPL command(s):	`^CC` or `~CC`
	SGD command used:	`zpl.caret`
	User menu item:	COMMAND CHAR on page 111
	Printer web page:	View and Modify Printer Settings > ZPL Control
Control Character	The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction. Set the control prefix character to match what is used in your label formats.	
	Accepted values:	00 to FF
	Related ZPL command(s):	`^CT` or `~CT`
	SGD command used:	`zpl.control_character`
	User menu item:	CONTROL CHAR on page 111
	Printer web page:	View and Modify Printer Settings > ZPL Control
Delimiter Character	The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. Set the delimiter character to match what is used in your label formats.	
	Accepted values:	00 to FF
	Related ZPL command(s):	`^CD` or `~CD`
	SGD command used:	`zpl.delimiter`
	User menu item:	DELIMITER CHAR on page 112
	Printer web page:	View and Modify Printer Settings > ZPL Control

Table 5 • Language Settings (Continued)

ZPL Mode	Select the mode that matches what is used in your label formats. This printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. The printer remains in the selected mode until it is changed in one of the ways listed here.	
	Accepted values:	• ZPL II • ZPL
	Related ZPL command(s):	`^SZ`
	SGD command used:	`zpl.zpl_mode`
	User menu item:	ZPL MODE on page 112
	Printer web page:	View and Modify Printer Settings > ZPL Control

Sensor Settings

Table 6 • Sensor Settings

Sensor Type	Select the media sensor that is appropriate for the media that you are using. The reflective sensor typically is used only for black mark media. The transmissive sensor typically is used for other media types.	
	Accepted values:	• TRANSMISSIVE • REFLECTIVE
	Related ZPL command(s):	`^JS`
	SGD command used:	`device.sensor_select`
	User menu item:	SENSOR TYPE on page 113
	Printer web page:	View and Modify Printer Settings > Media Setup
Label Sensor	Set the sensitivity of the label sensor. **Important** • This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.	
	Accepted values:	0 – 255
	Related ZPL command(s):	none
	SGD command used:	`ezpl.label_sensor`
	User menu item:	LABEL SENSOR on page 113
	Printer web page:	View and Modify Printer Settings > Calibration
Take Label	Set the intensity of the take label LED. **Important** • This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.	
	Accepted values:	0 – 255
	Related ZPL command(s):	none
	SGD command used:	`ezpl.take_label`
	User menu item:	TAKE LABEL on page 114
	Printer web page:	View and Modify Printer Settings > Calibration

Port Settings

Table 7 • Port Settings

Baud Rate	Select the baud value that matches the one being used by the host computer.	
	Accepted values:	• 115200 • 57600 • 38400 • 28800 • 19200 • 14400 • 9600 • 4800
	Related ZPL command(s):	`^SC`
	SGD command used:	`comm.baud`
	User menu item:	BAUD RATE on page 115
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup
Data Bits	Select the data bits value that matches the one being used by the host computer.	
	Accepted values:	• 7 • 8
	Related ZPL command(s):	`^SC`
	SGD command used:	`comm.data_bits`
	User menu item:	DATA BITS on page 115
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup
Parity	Select the parity value that matches the one being used by the host computer.	
	Accepted values:	• NONE • EVEN • ODD
	Related ZPL command(s):	`^SC`
	SGD command used:	`comm.parity`
	User menu item:	PARITY on page 115
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup

Table 7 • Port Settings (Continued)

Host Handshake	Select the handshake protocol that matches the one being used by the host computer.	
	Accepted values:	- XON/XOFF - RTS/CTS - DSR/DTR
	Related ZPL command(s):	`^SC`
	SGD command used:	`comm.handshake`
	User menu item:	HOST HANDSHAKE on page 115
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup

BlueTooth Settings

Table 8 • BLUETOOTH Menu

Bluetooth Address	Displays the printer's Bluetooth Device Address	
	Accepted values:	N/A
	SGD command used:	`bluetooth.address`
Mode	Displays the Bluetooth connection pair printer's device type—Slave (typical) or Master.	
	Accepted values:	N/A
	SGD command used:	N/A
Discovery	Select if the printer is "Discoverable" for Bluetooth device pairing.	
	Accepted values:	ON = enables Bluetooth discoverable mode OFF = disables Bluetooth discoverable mode
	SGD command used:	`bluetooth.discoverable`
Connected	Displays the Bluetooth connection status to its paired device (Yes or No).	
	Accepted values:	N/A
	SGD command used:	N/A
BT Spec Version	Displays the Bluetooth operational specification level.	
	Accepted values:	`N/A`
	SGD command used:	`bluetooth.radio_version`
Min. Security Mode	Displays the printer's Bluetooth minimum level of applied security.	
	Accepted values:	N/A
	SGD command used:	N/A

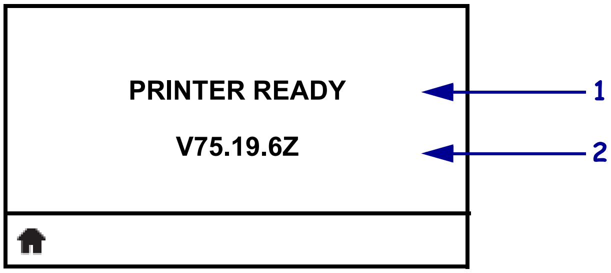
User Menus

The printer's control panel includes a display, where you can view the printer's status or change its operating parameters. In this section, you will learn how to navigate through the printer's menu system and change values for menu items.

Navigating through Screens in the Display

Idle Display After the printer completes the power-up sequence, it moves to the Idle Display (Figure 1). The printer cycles through its IP address and information configured by the user.

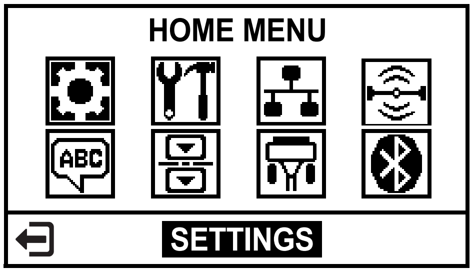
Figure 1 • Idle Display



1	The printer's current status
2	Information that is set through *Idle Display* on page 72
🏠	Home menu shortcut

Home Menu The printer’s operating parameters are sorted into eight user menus, which you can access through the printer’s Home menu (Figure 2). For detailed information about changing the printer settings, see *Adjust Printer Settings* on page 66.

Figure 2 • Home Menu



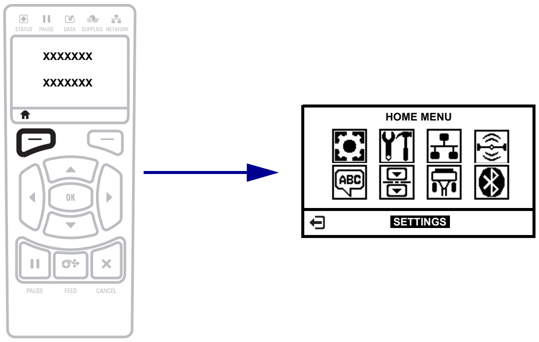
⚙	See *SETTINGS Menu* on page 94.
ABC	See *LANGUAGE Menu* on page 111.
🛠	See *TOOLS Menu* on page 97.
	See *SENSORS Menu* on page 113.

	See *NETWORK Menu* on page 102.
	See *PORTS Menu* on page 115.
	RFID — See *RFID Menu* on page 108.
	See *BLUETOOTH Menu* on page 117.
⇦	Exit and return to the Idle Display (Figure 1).

Navigation Table 9 shows the options available for navigating through the screens in the control panel display.

Table 9 • Navigation

Idle Display


STATUS PAUSE DATA SUPPLIES NETWORK
xxxxxxx
xxxxxxx
OK
PAUSE FEED CANCEL
HOME MENU
ABC
SETTINGS

At the Idle Display (Figure 1 on page 90), press LEFT SELECT to go to the printer’s Home menu (Figure 2 on page 91).

Home Menu

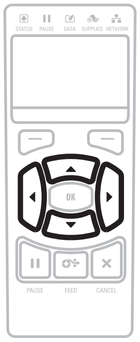
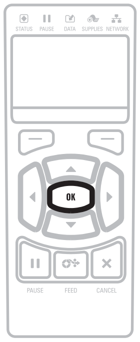
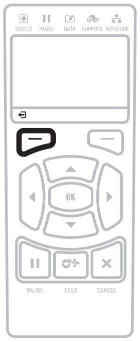
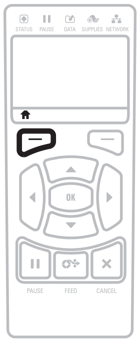
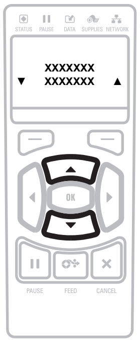
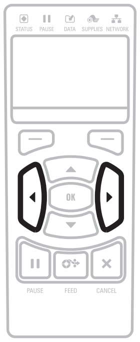
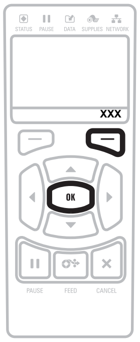
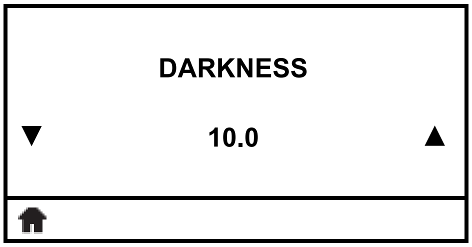
 To move from icon to icon in the Home menu, press any of the ARROW buttons. When an icon is selected, its colors are reversed to highlight it. SETTINGS menu icon SETTINGS menu icon highlighted	 To select the highlighted menu icon and enter the menu, press OK.	 Press LEFT SELECT to exit the Home menu and return to the Idle Display. The printer automatically returns to the Idle Display after 15 seconds of inactivity in the Home menu.

Table 9 • Navigation (Continued)

User Menus	
 STATUS PAUSE DATA SUPPLIES NETWORK OK PAUSE FEED CANCEL Press LEFT SELECT to return to the Home menu. The printer automatically returns to the Home menu after 15 seconds of inactivity in a user menu.	 STATUS PAUSE DATA SUPPLIES NETWORK XXXXXXX XXXXXXX OK PAUSE FEED CANCEL ▼and ▲ indicate that a value can be changed. Any changes that you make are saved immediately. Press the UP ARROW or DOWN ARROW to scroll through accepted values.
 STATUS PAUSE DATA SUPPLIES NETWORK OK PAUSE FEED CANCEL To scroll through the items in a user menu, press the LEFT ARROW or RIGHT ARROW.	 STATUS PAUSE DATA SUPPLIES NETWORK XXX OK PAUSE FEED CANCEL A word in the bottom-right corner of the display indicates an available action. Press OK or press RIGHT SELECT to perform the action shown.

SETTINGS Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see *Print Settings* on page 67.



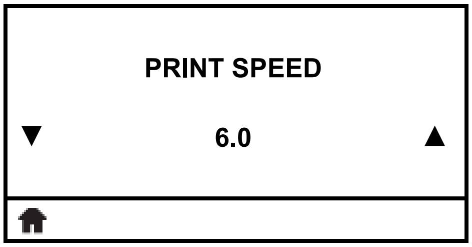
DARKNESS

▼ 10.0 ▲

Adjust the Print Darkness

Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.

See *Print Darkness* on page 67 for more information.



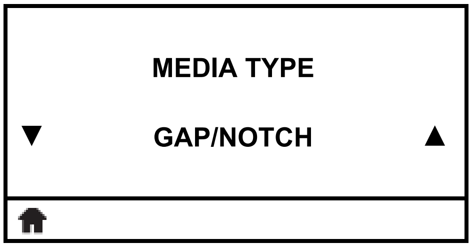
PRINT SPEED

▼ 6.0 ▲

Select the Print Speed

Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality.

See *Print Speed* on page 67 for more information.



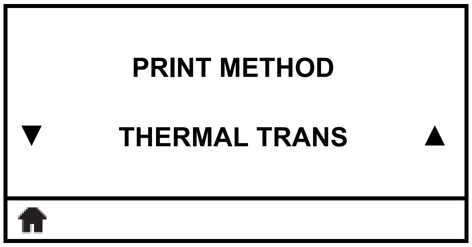
MEDIA TYPE

▼ GAP/NOTCH ▲

Set the Media Type

Select the type of media that you are using.

See *Media Type* on page 67 for more information.



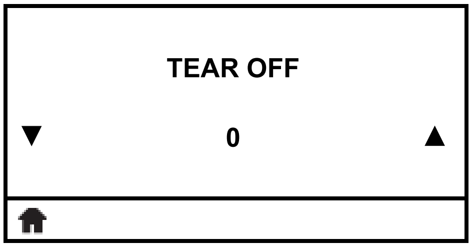
PRINT METHOD

▼ THERMAL TRANS ▲

Select the Print Method

Specify if the printer is to use Direct Thermal mode (no ribbon) or Thermal Transfer mode (using thermal transfer media and ribbon).

See *Print Method* on page 68 for more information.



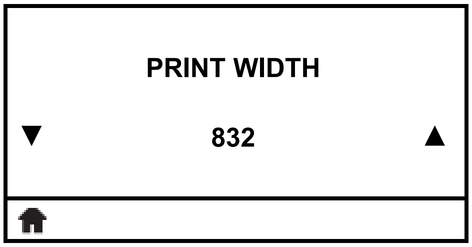
TEAR OFF

▼ 0 ▲

Adjust the Tear-Off Position

If necessary, adjust the position of the media over the tear-off bar after printing.

See *Tear-Off Position* on page 68 for more information.



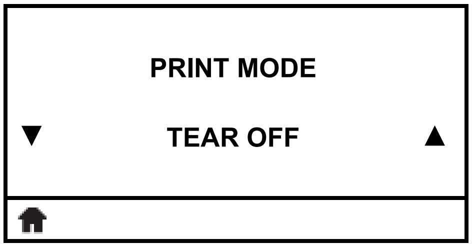
PRINT WIDTH

▼ 832 ▲

Adjust the Print Width

Specify the width of the labels being used. The default value is the maximum width for the printer, based on the printhead's DPI value.

See *Print Width* on page 69 for more information.



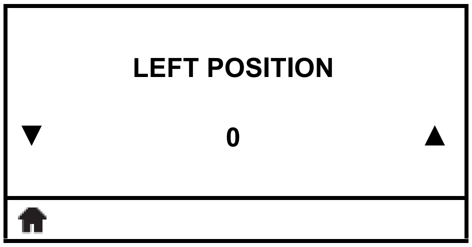
PRINT MODE

▼ TEAR OFF ▲

Select the Print Mode

Select a print mode that is compatible with your printer options.

See *Print Mode* on page 69 for more information.



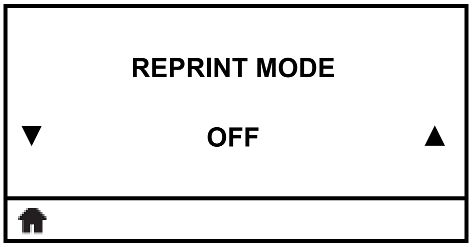
LEFT POSITION

▼ 0 ▲

Adjust the Label Left Position

If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.

See *Label Left Position* on page 69 for more information.



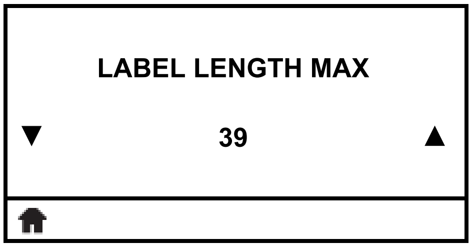
REPRINT MODE

▼ OFF ▲

Set the Reprint Mode

When reprint mode is enabled, you can reprint the last label printed either by issuing certain commands or by pressing the LEFT ARROW on the control panel.

See *Reprint Mode* on page 70 for more information.



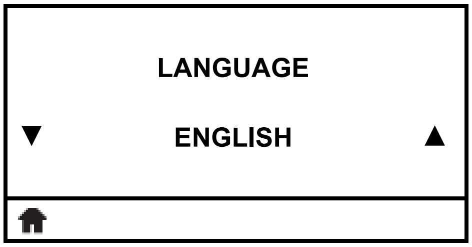
LABEL LENGTH MAX

▼ 39 ▲

Set the Maximum Label Length

Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.

See *Maximum Label Length* on page 70 for more information.



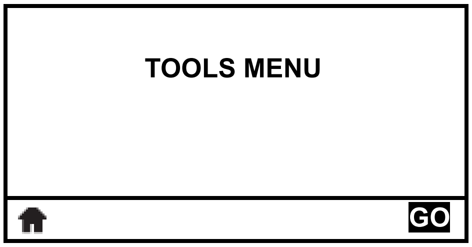
LANGUAGE

▼ ENGLISH ▲

Select the Display Language

If necessary, change the language that the printer displays. See *Language* on page 83 for more information.

Note • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.

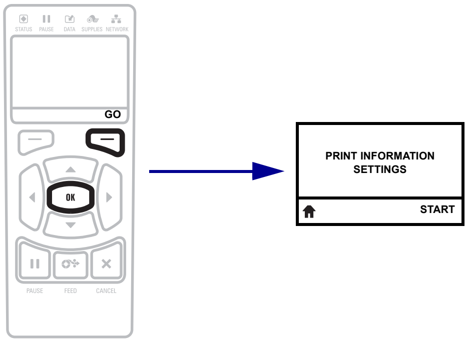


TOOLS MENU

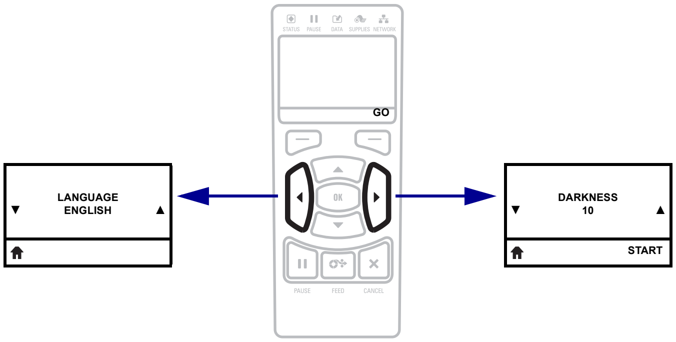
GO

Tools Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

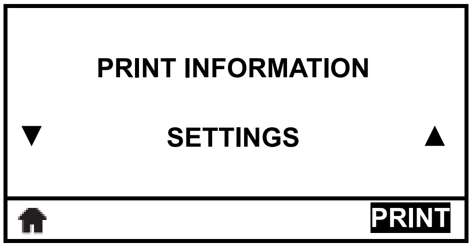

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
PRINT INFORMATION
SETTINGS
START

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


LANGUAGE
ENGLISH
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
DARKNESS
10
START

TOOLS Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 2, *Calibration and Diagnostic Tools* on page 71.



PRINT INFORMATION

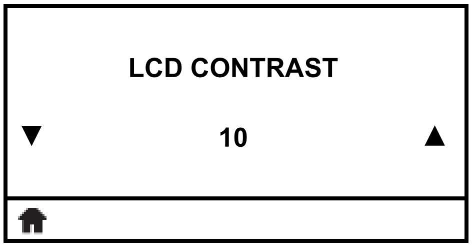
▼ SETTINGS ▲

List the Printer Information*

Prints a printer configuration label.

See *Print Information* on page 71 for more information.

* *Other options are available by scrolling.*



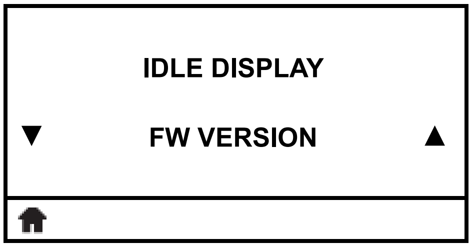
LCD CONTRAST

▼ 10 ▲

Set the Display Contrast

Change the contrast on the printer's display.

See *LCD Contrast* on page 72 for more information.



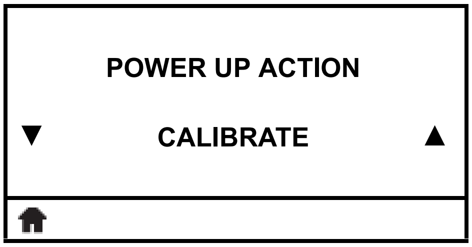
IDLE DISPLAY

▼ FW VERSION ▲

Select the Idle Display

Select the information shown on the printer's display when the printer is idle.

See *Idle Display* on page 72 for more information.



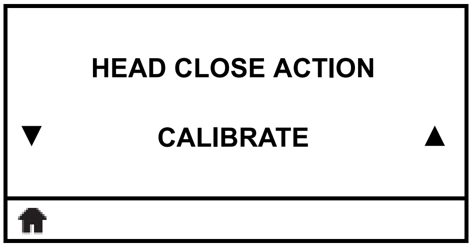
POWER UP ACTION

▼ CALIBRATE ▲

Set the Power-Up Action

Set the action for the printer to take during the power-up sequence.

See *Power-Up Action* on page 72 for more information.

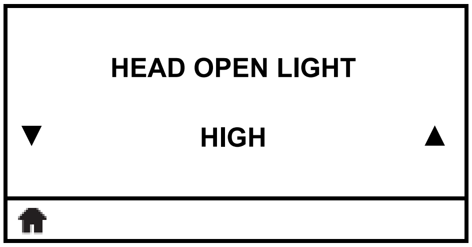


HEAD CLOSE ACTION
CALIBRATE

Set the Head-Close Action

Set the action for the printer to take when you close the printhead.

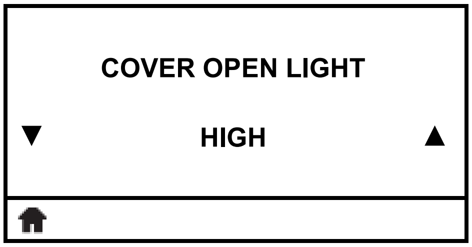
See *Head-Close Action* on page 73 for more information.



HEAD OPEN LIGHT
HIGH

Set the Head-Open Light Action

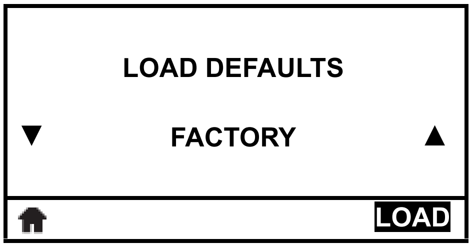
Set the brightness of the light that turns on when the printhead is open.



COVER OPEN LIGHT
HIGH

Set the Cover Open Light Action

Set the brightness of the light that turns on when the media door is open.



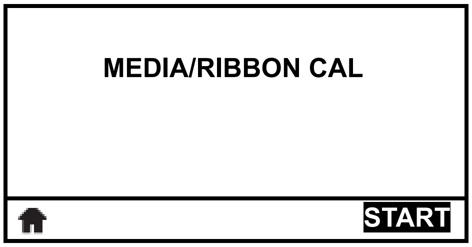
LOAD DEFAULTS
FACTORY

Load Printer Defaults*

Use this menu item to restore all settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.

See *Load Defaults* on page 74 for more information.

* *Other options are available by scrolling.*

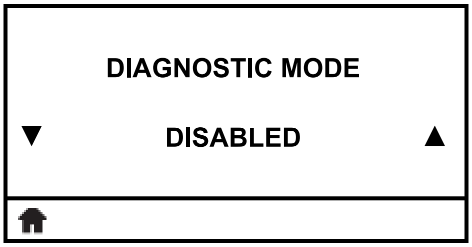


MEDIA/RIBBON CAL

Calibrate the Media and Ribbon Sensors

Use this menu item to adjust the sensitivity of the media and ribbon sensors.

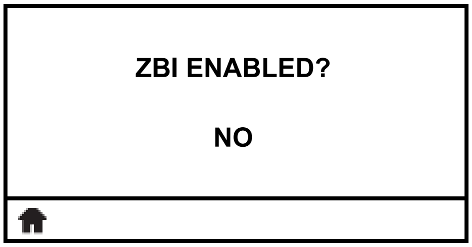
See *Media and Ribbon Sensor Calibration* on page 75 for more information. For instructions on how to perform a calibration procedure, see *Calibrate the Ribbon and Media Sensors* on page 119.



Enable Communication Diagnostics Mode

Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer.

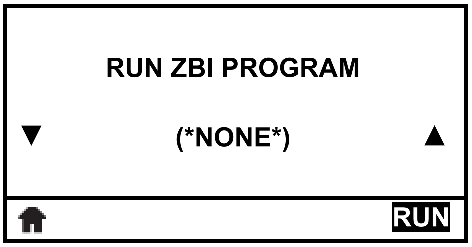
See *Communication Diagnostics Mode* on page 75 for more information.



Is ZBI Enabled?

This menu item indicates if the Zebra Basic Interpreter (ZBI 2.0™) option is enabled on your printer. If you would like to purchase this option, contact your Zebra reseller for more information.

See *Enable ZBI* on page 76 for more information.



Run a ZBI Program*

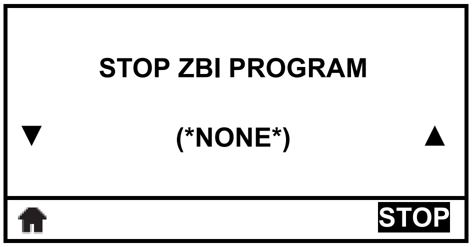
If ZBI programs exist on your printer, they are listed. If no program exists, NONE is listed.

If you wish to run a ZBI program that you have downloaded to your printer:

1. Use the UP ARROW or DOWN ARROW to select the file from this menu.
2. Press RIGHT SELECT to select RUN. If no program exists, the RUN option does not perform an action.

See *Run a ZBI Program* on page 76 for more information.

* *This menu item appears only if ZBI is enabled on your printer and no ZBI program is running.*

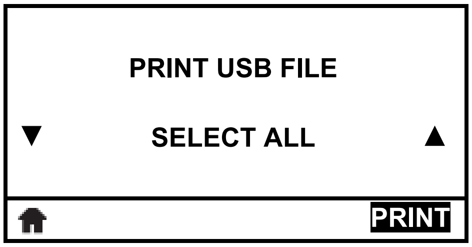


Stop a ZBI Program*

If a ZBI program is running, the printer lists it. If you wish to stop the program, press RIGHT SELECT to select STOP.

See *Stop a ZBI Program* on page 76 for more information.

* *This menu item appears only if ZBI is enabled on your printer and a ZBI program is running.*

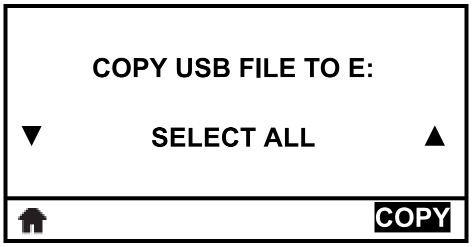


Print a File from a USB Flash Drive*

Use this menu item to select files to print from a USB Flash drive.

1. Use the UP ARROW or DOWN ARROW to select one file or all files from this menu.
2. Press RIGHT SELECT to select PRINT.

* *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*

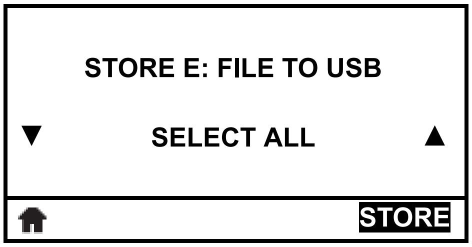


Save a File from a USB Flash Drive to the Printer*

Use this menu item to copy files from a USB Flash drive to your printer.

1. Use the UP ARROW or DOWN ARROW to select one file or all files from this menu.
2. Press RIGHT SELECT to select COPY.

* *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*

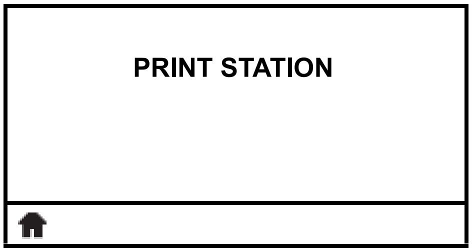


Save a File from the Printer to a USB Flash Drive*

Use this menu item to save files from your printer to a USB Flash drive.

1. Use the UP ARROW or DOWN ARROW to select one file or all files from this menu.
2. Press RIGHT SELECT to select STORE.

* *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*

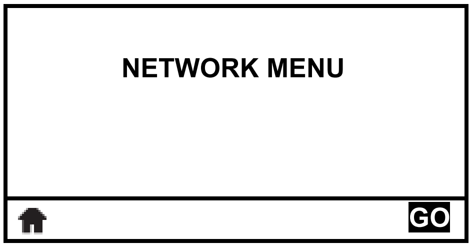


Fill in a Form and Print a Label Format from the Display

Use this menu item to fill in variable fields in a label format and print the label using a Human Input Device (HID), such as a USB keyboard or scanner. A suitable label format must be stored on the E: drive of the printer to use this option.

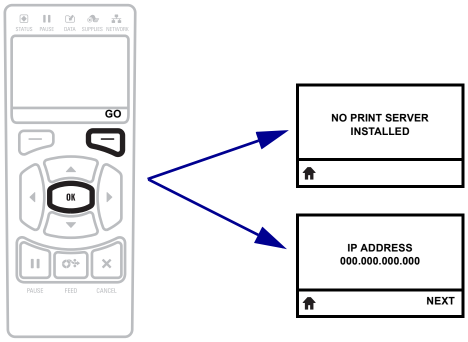
When the printer finds an HID plugged into the printer's USB host port, it uses this user menu to prompt you to select a form on the printer's E: drive. After you have been prompted to fill in each variable `^FN` field on the form, you can specify the desired quantity of labels to print.

For more information about using the `^FN` command, refer to the *Zebra Programming Guide*. You can download a copy of the manual from http://www.zebra.com/manuals/.

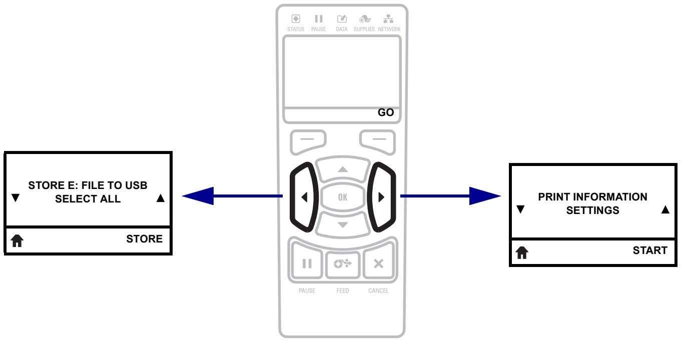

NETWORK MENU
GO

Network Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

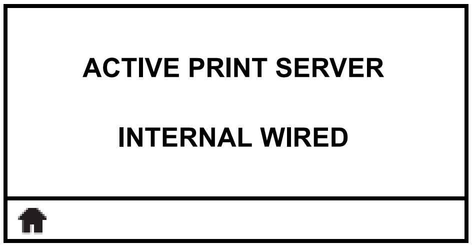

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
NO PRINT SERVER INSTALLED
IP ADDRESS 000.000.000.000
NEXT

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


STORE E: FILE TO USB
SELECT ALL
STORE
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
PRINT INFORMATION
SETTINGS
START

NETWORK Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 3, *Network Settings* on page 77. For more information about print servers and how they function, refer to the *Wired and Wireless Print Server User Guide*. A copy of this manual is available at http://www.zebra.com/manuals.

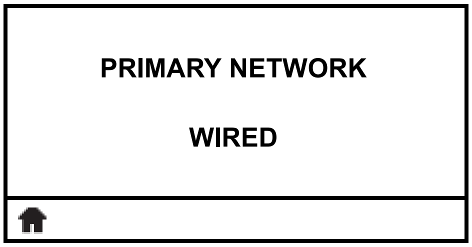


ACTIVE PRINT SERVER

INTERNAL WIRED

View the Active Print Server

Only one print server (wired or wireless) can be installed at a time. Therefore, the print server installed is the active print server.

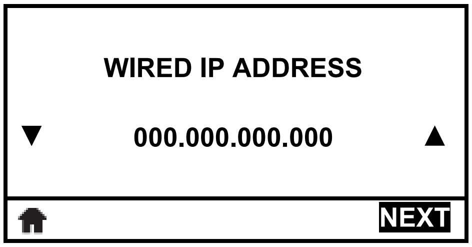


PRIMARY NETWORK

WIRED

View the Active Print Server

Only one print server (wired or wireless) can be installed at a time. Therefore, the print server installed is the active print server.



WIRED IP ADDRESS

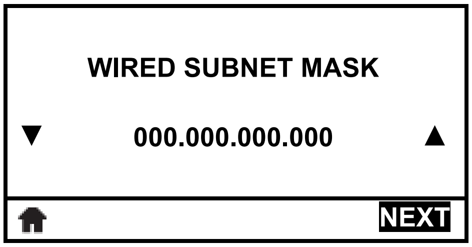
▼ 000.000.000.000 ▲

Set the Printer's IP Address

View and, if necessary, change the printer's IP address.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *IP Address* on page 77 for more information.



WIRED SUBNET MASK

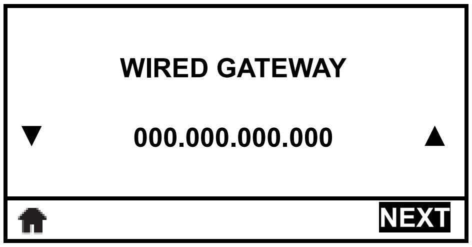
▼ 000.000.000.000 ▲

Set the Subnet Mask

View and, if necessary, change the subnet mask.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *Subnet Mask* on page 77 for more information.



WIRED GATEWAY

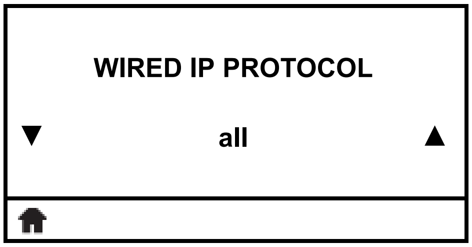
▼ 000.000.000.000 ▲

Set the Default Gateway

View and, if necessary, change the default gateway.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *Gateway* on page 77 for more information.



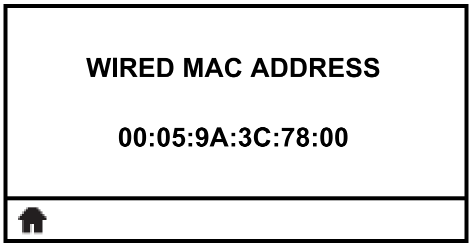
WIRED IP PROTOCOL

▼ all ▲

Set the IP Resolution Method

This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. When a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.

See *IP Protocol* on page 78 for more information.



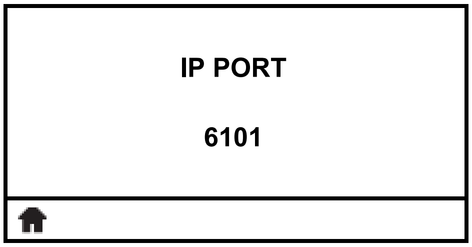
WIRED MAC ADDRESS

00:05:9A:3C:78:00

View the MAC Address

View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).

See *MAC Address* on page 78 for more information.



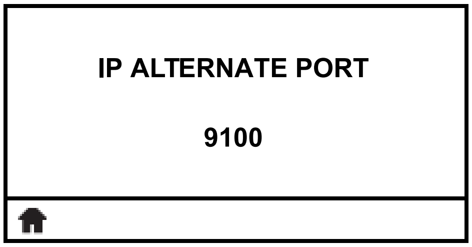
IP PORT

6101

View the Primary TCP/IP Port

View the Ethernet TCP port number, over which labels and commands can be sent for processing.

* *This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.*



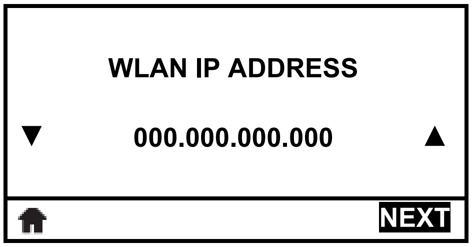
IP ALTERNATE PORT

9100

View the Alternate TCP/IP Port

View the alternate Ethernet TCP port number, over which labels and commands can be sent for processing.

* *This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.*



WLAN IP ADDRESS

000.000.000.000

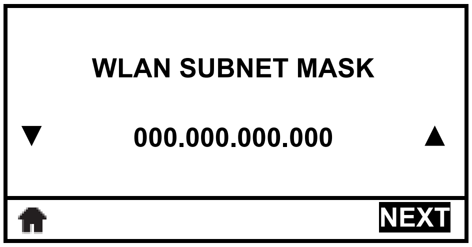
Set the Printer’s IP Address*

View and, if necessary, change the printer’s IP address.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *IP Address* on page 77 for more information.

* *This menu item appears only if a wireless print server is installed in your printer.*



WLAN SUBNET MASK

000.000.000.000

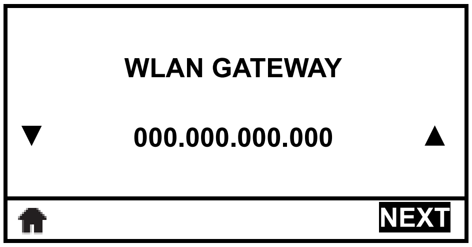
Set the Subnet Mask*

View and, if necessary, change the subnet mask.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *Subnet Mask* on page 77 for more information.

* *This menu item appears only if a wireless print server is installed in your printer.*



WLAN GATEWAY

000.000.000.000

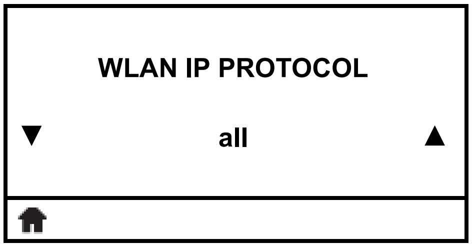
Set the Default Gateway*

View and, if necessary, change the default gateway.

Changes are saved only if WIRED IP PROTOCOL on page 103 is set to PERMANENT. To allow any saved changes to take effect, use RESET NETWORK on page 106 to reset the print server.

See *Gateway* on page 77 for more information.

* *This menu item appears only if a wireless print server is installed in your printer.*



WLAN IP PROTOCOL

all

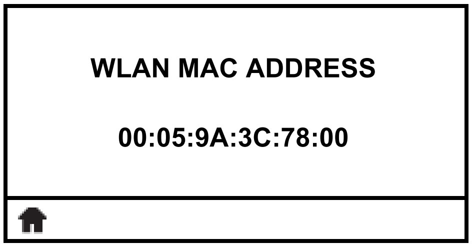
Set the IP Resolution Method*

This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. When a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.

See *IP Protocol* on page 78 for more information.

* *This menu item appears only if a wireless print server is installed in your printer.*

View the MAC Address*


WLAN MAC ADDRESS

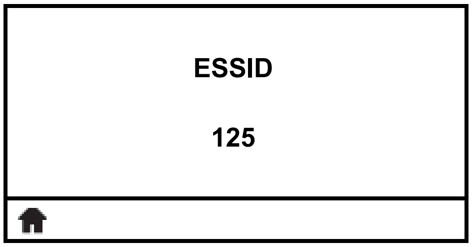
00:05:9A:3C:78:00

View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).

See *MAC Address* on page 78 for more information.

* *This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.*

View the ESSID Value*


ESSID

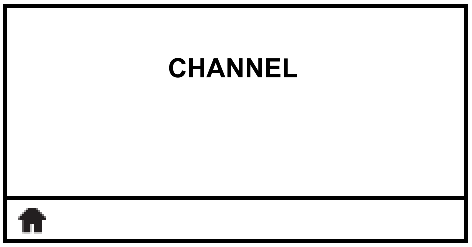
125

The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.

See *ESSID* on page 78 for more information.

* *This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.*

View the Channel Value*

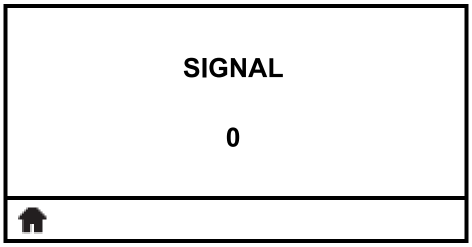

CHANNEL

View the wireless channel being used when the wireless network is active and authenticated. No value indicates that you have no a wireless connection.

See *Channel* on page 79 for more information.

* *This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.*

View the Signal Value*

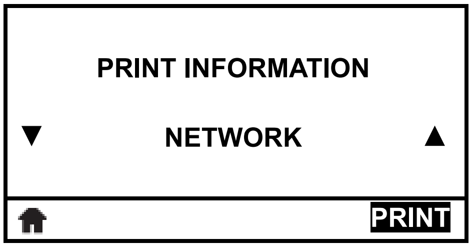

SIGNAL

0

View the wireless signal strength when the wireless network is active and authenticated. A value of zero indicates that you have no wireless connection.

See *Signal* on page 79 for more information.

* *This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.*

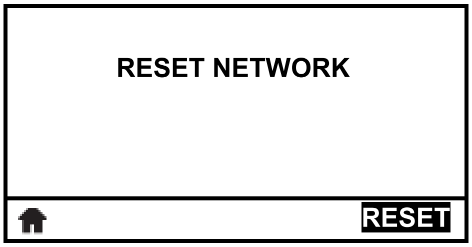


Print the Network Settings*

This option prints a network configuration label, which lists the settings for any print server that is installed.

See *Print Information* on page 71 for more information.

* *Other options are available by scrolling.*

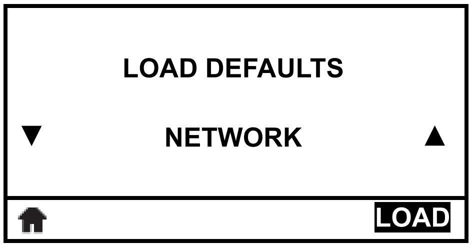


Reset the Network Settings*

This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.

See *Reset Network* on page 79 for more information.

* *This menu item appears only if a wired or wireless print server is installed in your printer.*

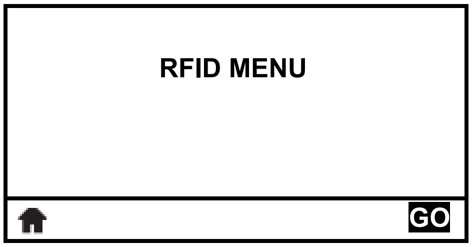


Load Network Defaults*

Use this menu item to restore all print server and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.

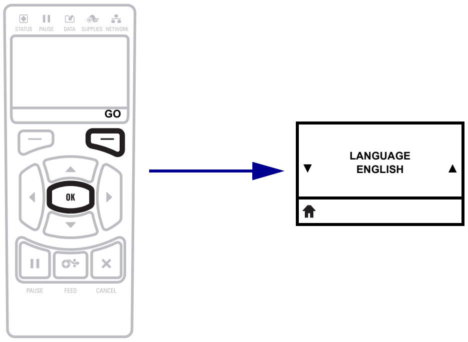
See *Load Defaults* on page 74 for more information.

* *This menu item appears only if a wired or wireless print server is installed in your printer. Other options are available by scrolling.*

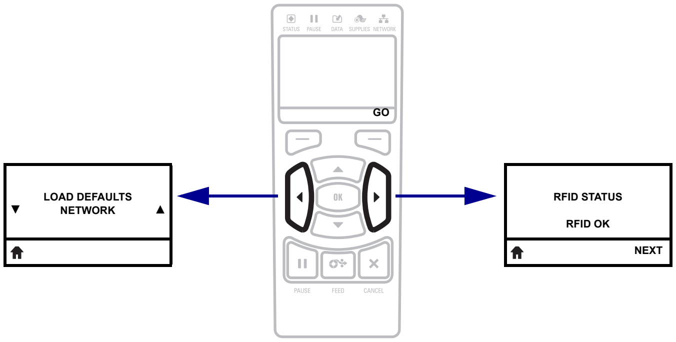

RFID MENU
GO

RFID Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

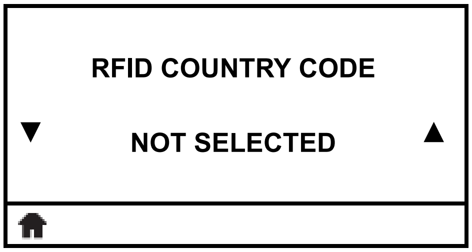

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
LANGUAGE
ENGLISH

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


LOAD DEFAULTS
NETWORK
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
RFID STATUS
RFID OK
NEXT

RFID Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 4, *RFID Settings* on page 80.



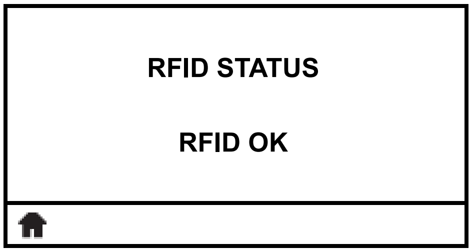
RFID COUNTRY CODE

NOT SELECTED

Select the RFID Country Code

Select the RFID country code (if applicable).

Note • A prompt for the country code appears only on some printers the first time that they are powered up, depending on the world region to which the printers were shipped. Specify the appropriate country to access the printer’s RFID features.



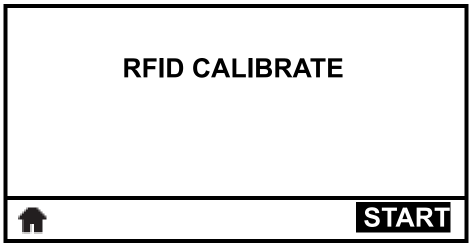
RFID STATUS

RFID OK

View the RFID Status

This parameter displays the status of the RFID subsystem of the printer. During an error condition, an error message displays.

See *RFID Status* on page 80 for more information.

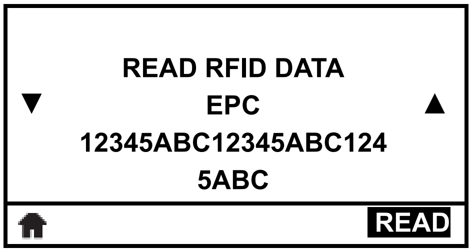


RFID CALIBRATE

Perform RFID Tag Calibration

Initiate tag calibration for RFID media.

See *RFID Tag Calibration* on page 82 for more information.



READ RFID DATA
EPC
12345ABC12345ABC124
5ABC

Read and Display the RFID Tag Data

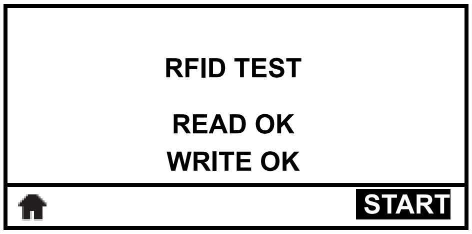
When this option is selected, the reader attempts to read the specified information from an RFID tag, even if the printhead is open. No printer movement occurs while tag data is being read.

If you wish to read and display the information stored in an RFID tag:

1. Position the RFID label with its transponder over the RFID antenna.
2. Use the UP ARROW or DOWN ARROW to select the type of information that you want read and displayed.
3. Press RIGHT SELECT to select READ.
   The results of the test are shown on the display.

See *Read RFID Data* on page 80 for more information.

Perform an RFID Test



RFID TEST

READ OK
WRITE OK

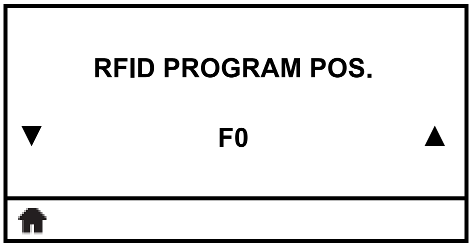
During the RFID test, the printer attempts to read and write to a transponder. No printer movement occurs with this test.

If you wish to test an RFID label:

1. Position the RFID label with its transponder over the RFID antenna array.
2. Press RIGHT SELECT to select START.
   The results of the test are shown on the display.

See *RFID Test* on page 80 for more information.

Display or Change the RFID Programming Position



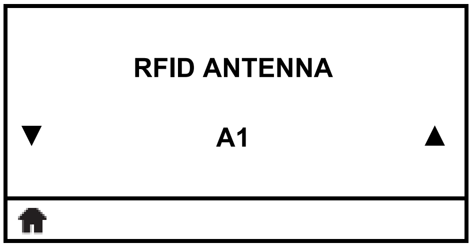
RFID PROGRAM POS.

F0

This menu item displays the current programming position. If the desired programming position is not achieved through RFID tag calibration, a value may be specified.

See *Programming Position* on page 81 for more information.

Display or Change the RFID Antenna Element



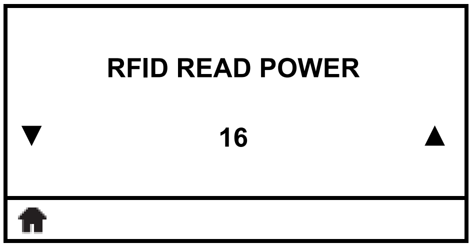
RFID ANTENNA

A1

This menu item displays the RFID antenna element in use. If the desired antenna element is not selected through RFID tag calibration, a value may be specified.

See *RFID Antenna Element* on page 81 for more information.

Display or Change the RFID Read Power



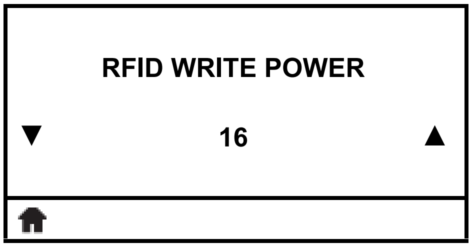
RFID READ POWER

16

This menu item displays the current read power setting. If the desired read power is not achieved through RFID tag calibration, a value may be specified.

See *RFID Read Power* on page 82 for more information.

Display or Change the RFID Write Power

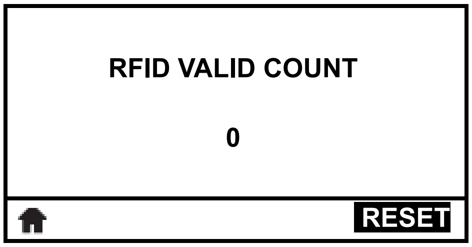


RFID WRITE POWER

16

This menu item displays the current write power setting. If the desired write power is not achieved through RFID tag calibration, a value may be specified.

See *RFID Write Power* on page 82 for more information.



RFID VALID COUNT

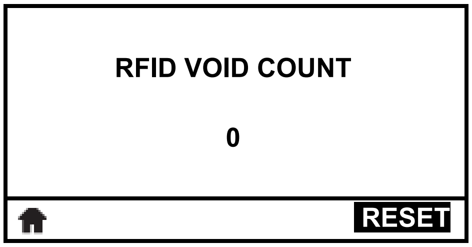
0

RESET

Display or Reset the RFID Valid Counter

Displays the RFID valid label count or resets the counter to zero.

See *RFID Valid Counter* on page 82 for more information.



RFID VOID COUNT

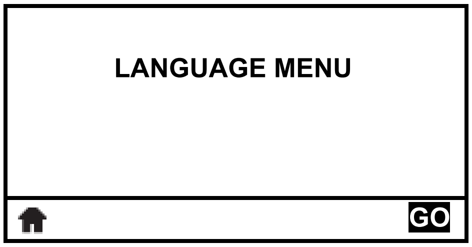
0

RESET

Display or Reset the RFID Void Counter

Displays the RFID void label count or resets the counter to zero.

See *RFID Void Counter* on page 82 for more information.

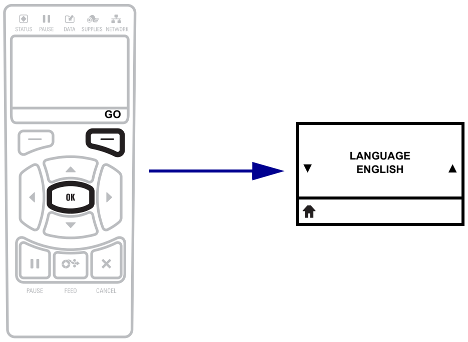


LANGUAGE MENU

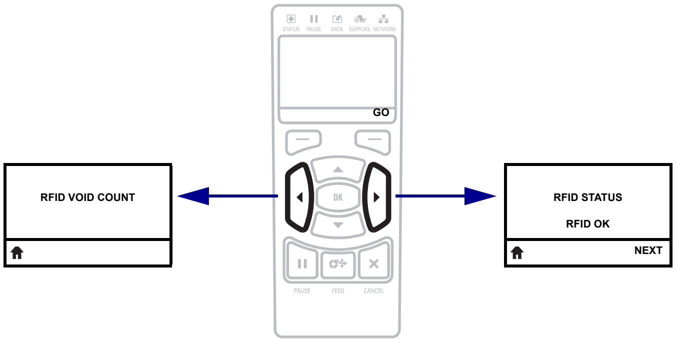
GO

Language Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.


STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
LANGUAGE
ENGLISH

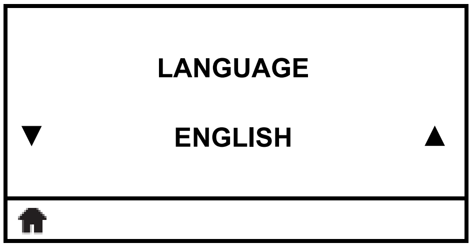
- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


RFID VOID COUNT
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
RFID STATUS
RFID OK
NEXT

LANGUAGE Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 5, *Language Settings* on page 83.

Select the Display Language



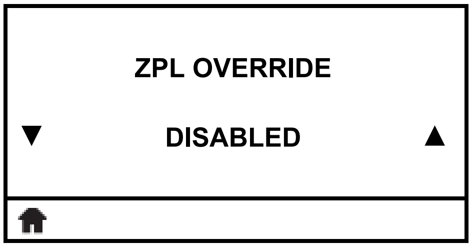
LANGUAGE
▼ ENGLISH ▲

If necessary, change the language that the printer displays.

See *Language* on page 83 for more information.

Note • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.

Enable ZPL Override

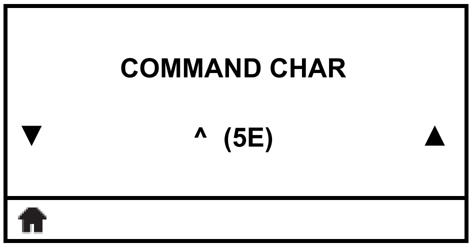


ZPL OVERRIDE
▼ DISABLED ▲

Enable this menu item to allow certain ZPL commands to override the printer’s current settings.

See *ZPL Override* on page 83 for more information.

Set the Command Character Value

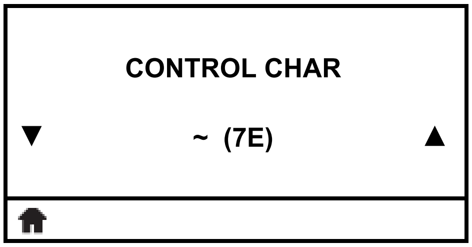


COMMAND CHAR
▼ ^ (5E) ▲

Set the format command character to match what is used in your label formats.

See *Command Character* on page 84 for more information.

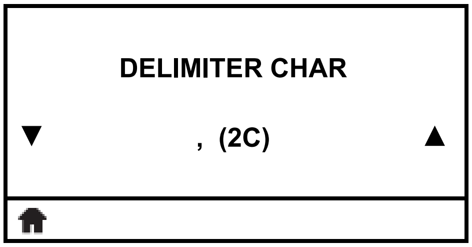
Set the Control Character Value



CONTROL CHAR
▼ ~ (7E) ▲

Set the control prefix character to match what is used in your label formats.

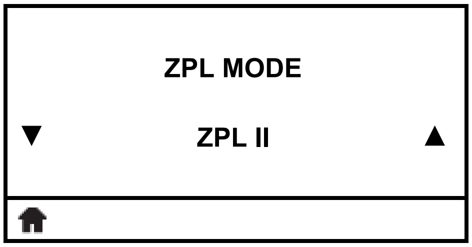
See *Control Character* on page 84 for more information.


DELIMITER CHAR
▼ , (2C) ▲

Set the Delimiter Character Value

Set the delimiter character to match what is used in your label formats.

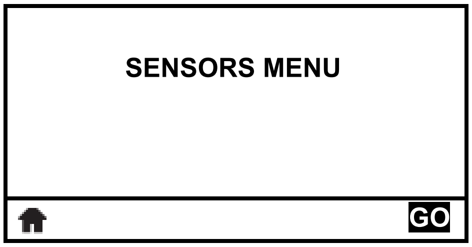
See *Delimiter Character* on page 84 for more information.


ZPL MODE
▼ ZPL II ▲

Set the ZPL Mode

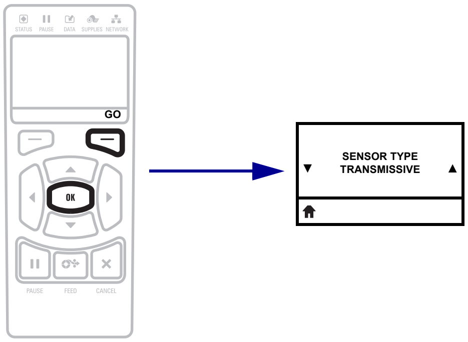
Select the mode that matches what is used in your label formats.

See *ZPL Mode* on page 85 for more information.

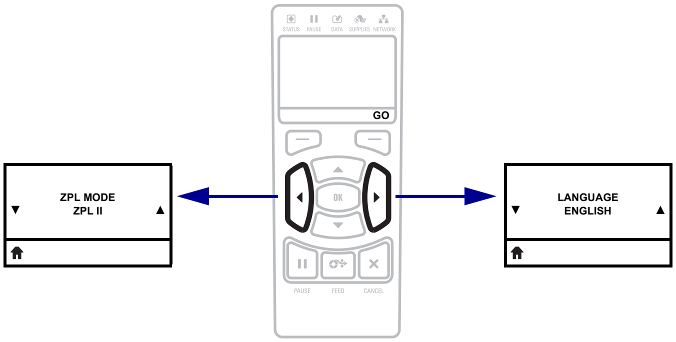

SENSORS MENU
GO

Sensors Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

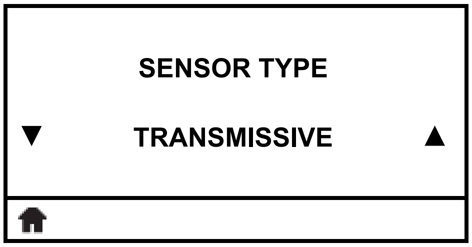

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
SENSOR TYPE
TRANSMISSIVE

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


ZPL MODE
ZPL II
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
LANGUAGE
ENGLISH

SENSORS Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 6, *Sensor Settings* on page 86.

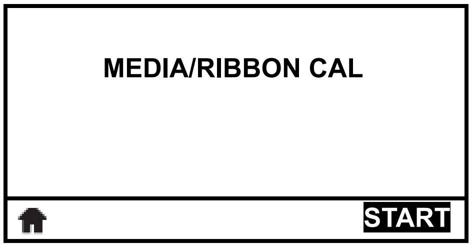

SENSOR TYPE

▼ TRANSMISSIVE ▲

Select the Media Sensor

Select the media sensor that is appropriate for the media that you are using. The reflective sensor typically is used only for black mark media. The transmissive sensor typically is used for other media types.

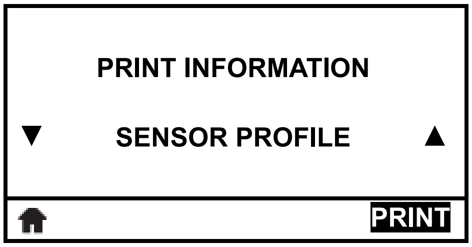
See *Sensor Type* on page 86 for more information.


MEDIA/RIBBON CAL

Calibrate the Media and Ribbon Sensors

Use this menu item to adjust the sensitivity of the media and ribbon sensors.

For instructions on how to perform a calibration procedure, see *Calibrate the Ribbon and Media Sensors* on page 119.


PRINT INFORMATION

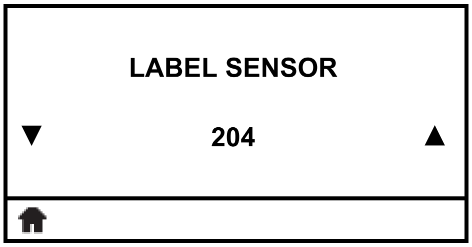
▼ SENSOR PROFILE ▲

Print a Sensor Profile*

Use this menu item to print a sensor profile.

See *Print Information* on page 71 or *Sensor Profile* on page 170 for more information.

* *Other options are available by scrolling.*


LABEL SENSOR

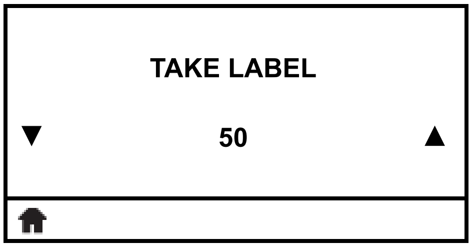
▼ 204 ▲

Set the Sensitivity of the Label Sensor

Important • This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.

See *Label Sensor* on page 86 for more information.

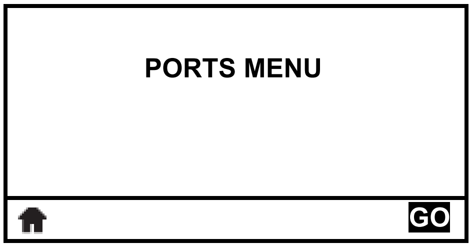
Set the Intensity of the Take Label LED


TAKE LABEL
▼
50
▲

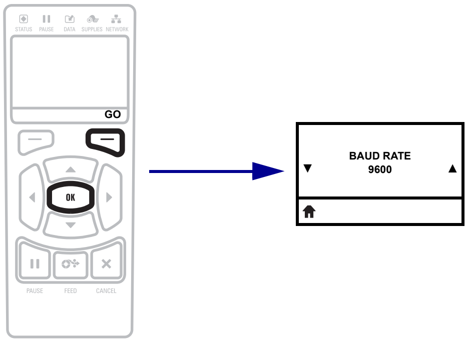
Important • This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.

See *Take Label* on page 86 for more information.

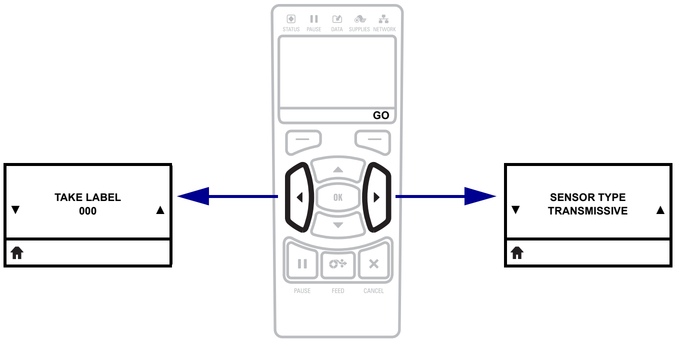
Ports Menu Shortcut


PORTS MENU
GO

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

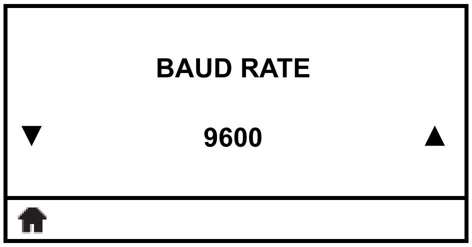

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
BAUD RATE
9600

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


TAKE LABEL
000
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
SENSOR TYPE
TRANSMISSIVE

PORTS Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Table 7, *Port Settings* on page 87.



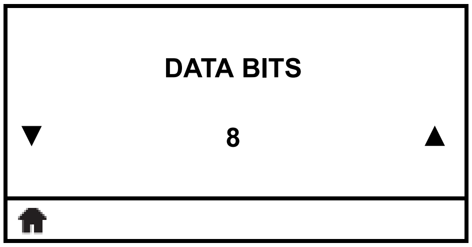
BAUD RATE

▼ 9600 ▲

Set the Baud Rate

Select the baud value that matches the one being used by the host computer.

See *Baud Rate* on page 87 for more information.



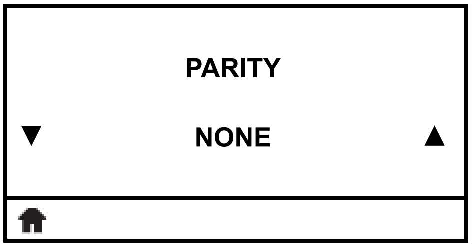
DATA BITS

▼ 8 ▲

Set the Data Bits Value

Select the data bits value that matches the one being used by the host computer.

See *Data Bits* on page 87 for more information.



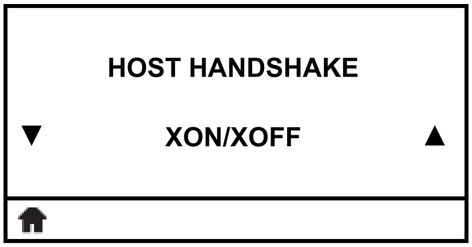
PARITY

▼ NONE ▲

Set the Parity Value

Select the parity value that matches the one being used by the host computer.

See *Parity* on page 87 for more information.



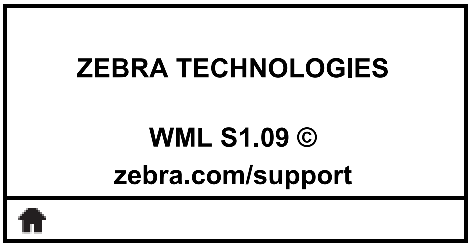
HOST HANDSHAKE

▼ XON/XOFF ▲

Set the Host Handshake Protocol Value

Select the handshake protocol that matches the one being used by the host computer.

See *Host Handshake* on page 88 for more information.

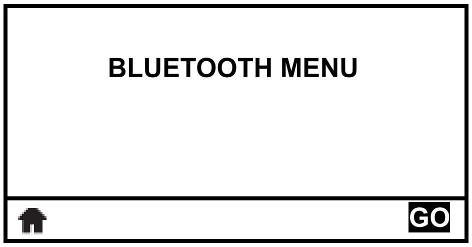


ZEBRA TECHNOLOGIES

WML S1.09 ©
zebra.com/support

View the Wireless Markup Language (WML) Version

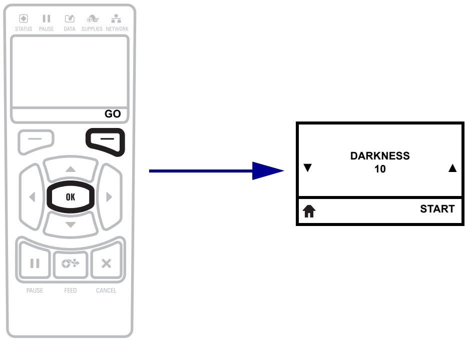
This value cannot be changed.



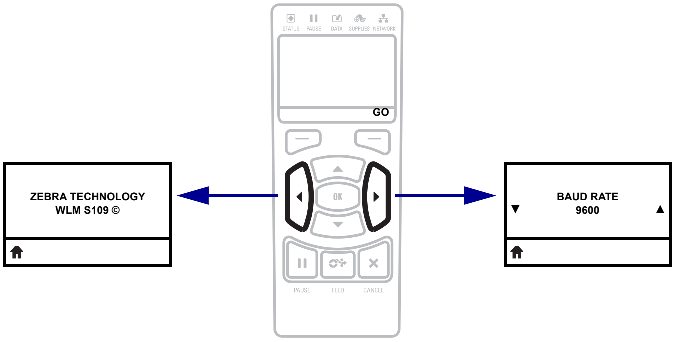
BLUETOOTH MENU

BlueTooth Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.

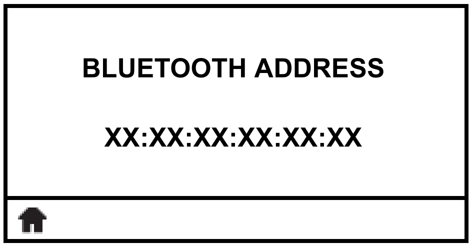

STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
DARKNESS
10
START

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


ZEBRA TECHNOLOGY
WLM S109 ©
STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
BAUD RATE
9600

BLUETOOTH Menu

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see *BlueTooth Settings* on page 89.



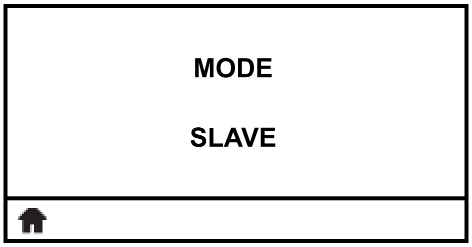
BLUETOOTH ADDRESS

XX:XX:XX:XX:XX:XX

View the BlueTooth Address

Displays the printer's Bluetooth Device Address

See *MAC Address* on page 78 for more information.



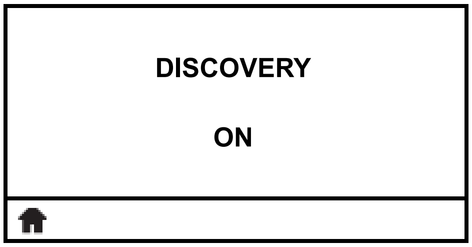
MODE

SLAVE

View the Printer's BlueTooth Mode

Displays the Bluetooth connection pair printer's device type—Slave (typical) or Master.

See *Baud Rate* on page 87 for more information.



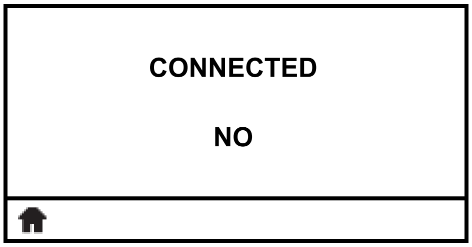
DISCOVERY

ON

View the Printer's BlueTooth Mode

Select if the printer is "Discoverable" for Bluetooth device pairing.

See *Baud Rate* on page 87 for more information.



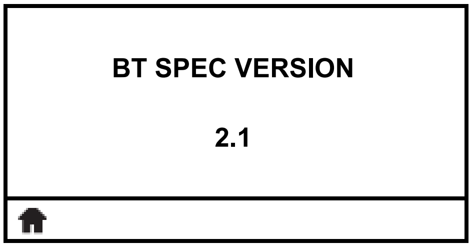
CONNECTED

NO

View the Printer's BlueTooth Mode

Displays the Bluetooth connection status to its paired device (Yes or No).

See *Baud Rate* on page 87 for more information.



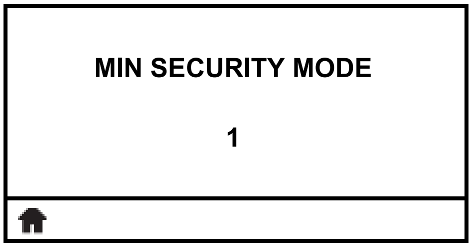
BT SPEC VERSION

2.1

View the Printer’s BlueTooth Mode

Displays the Bluetooth operational specification level.

See *Baud Rate* on page 87 for more information.



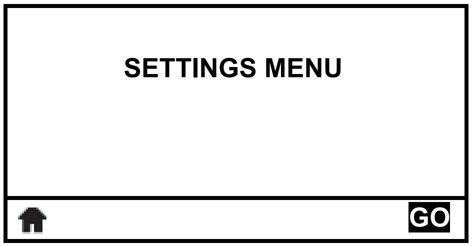
MIN SECURITY MODE

1

View the Printer’s BlueTooth Mode

Displays the printer’s Bluetooth minimum level of applied security.

See *Baud Rate* on page 87 for more information.

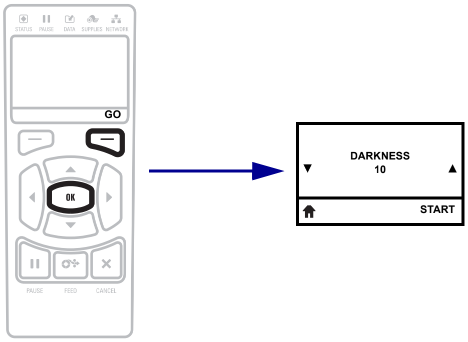


SETTINGS MENU

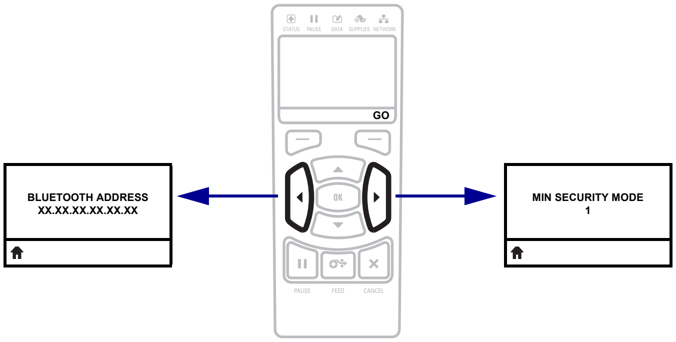
GO

Settings Menu Shortcut

- To be taken to the next user menu, press OK or press RIGHT SELECT to select GO.


STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
DARKNESS
10
START

- To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.


STATUS
PAUSE
DATA
SUPPLIES
NETWORK
GO
OK
PAUSE
FEED
CANCEL
BLUETOOTH ADDRESS
XX.XX.XX.XX.XX.XX
MIN SECURITY MODE
1

Calibrate the Ribbon and Media Sensors

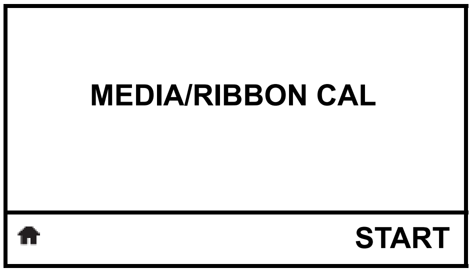
Use the procedure in this section to calibrate the printer, which adjusts the sensitivity of the media and ribbon sensors.

- For issues that may be resolved by sensor calibration, see *Printing Issues* on page 148.
- For a summary of the options for initiating calibration, see *Media and Ribbon Sensor Calibration* on page 75.

Important • Follow the calibration procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press and hold CANCEL at any step in this procedure to cancel the process.

To perform sensor calibration, complete these steps:

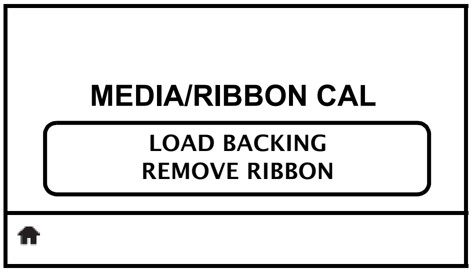
1. With the printer in the Ready state, initiate media and ribbon calibration in one of these ways:
   - Press and hold PAUSE + FEED + CANCEL for 2 seconds.
   - Send the `ezpl.manual_calibration` SGD command to the printer. See the *Zebra Programming Guide* for more information about this command.
   - Navigate to the following menu item on the control panel display. This item is located under the TOOLS menu and the SENSORS menu. See *Navigating through Screens in the Display* on page 90 for information about using the control panel and accessing the menus.



   a. Press RIGHT SELECT to select START.

The printer does the following:

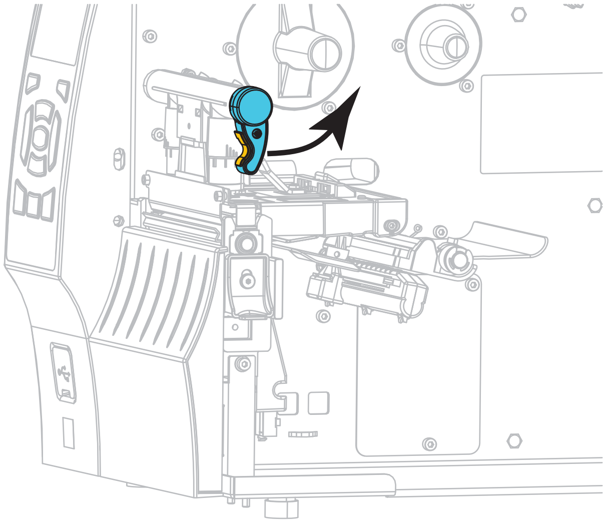
- The **STATUS light** and **SUPPLIES light** flash yellow once.
- The **PAUSE light** blinks yellow.
- The control panel displays:



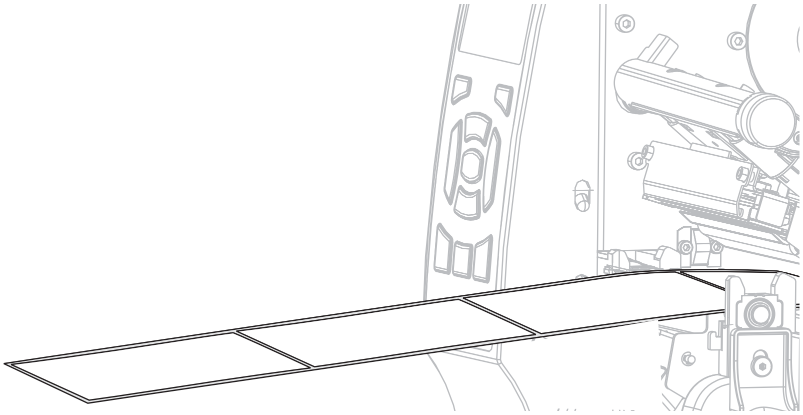
LOAD BACKING
REMOVE RIBBON

2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

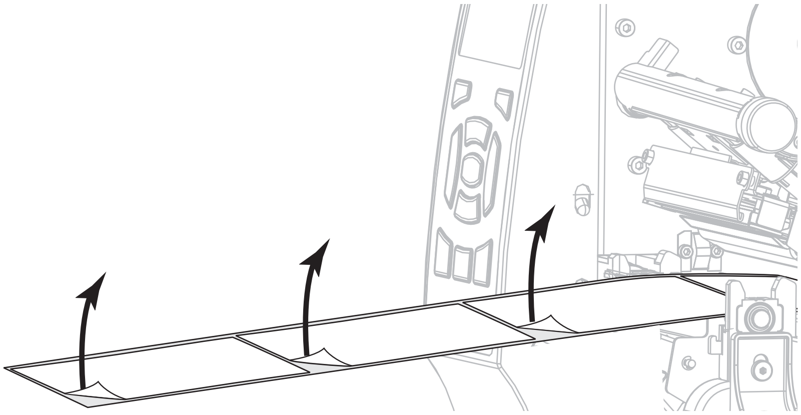
   Open the printhead assembly by rotating the printhead-open lever.



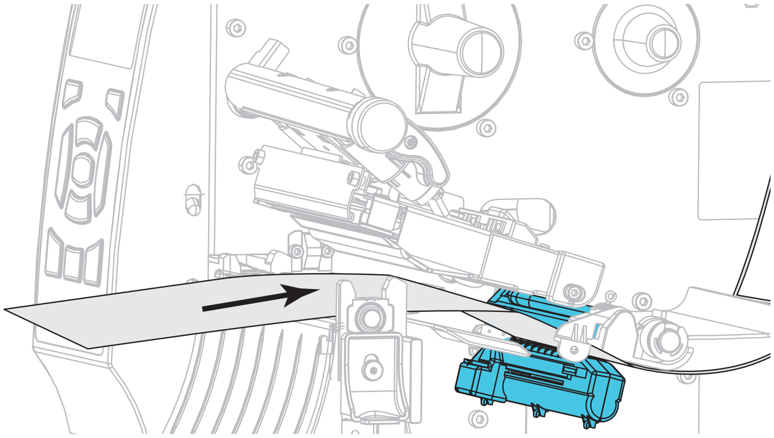
3. Extend the media approximately 8 in. (203 mm) out of the printer.



4. Remove the exposed labels so that only the liner remains.

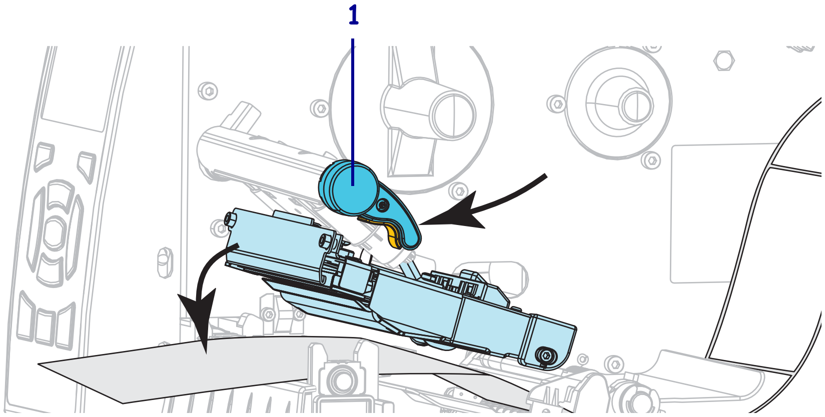


5. Pull the media into the printer so that only the backing is between the media sensors.

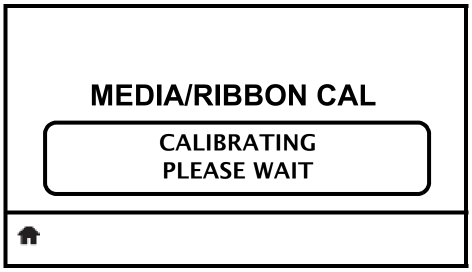


6. Remove the ribbon (if used).

7. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



8. Press PAUSE to begin the media calibration process.
   - The **PAUSE light** turns off.
   - The **SUPPLIES light** flashes.
   - The control panel displays:

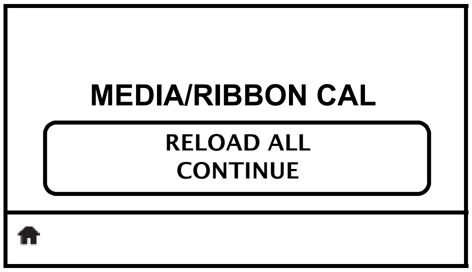


MEDIA/RIBBON CAL

CALIBRATING
PLEASE WAIT

When the process is complete:

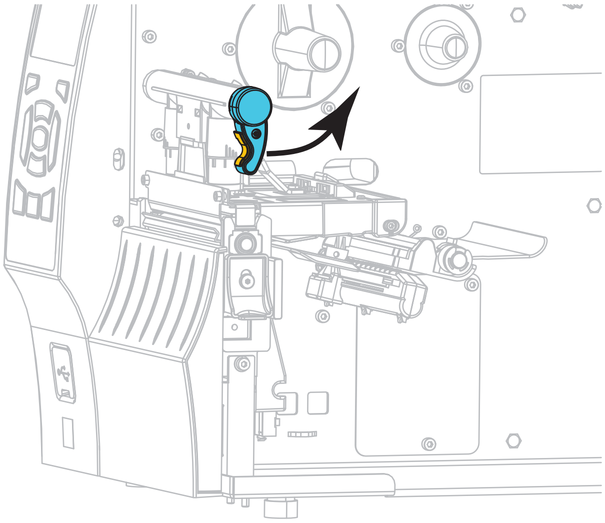
- The **SUPPLIES light** stops flashing.
- The **PAUSE light** flashes yellow.
- The control panel displays:



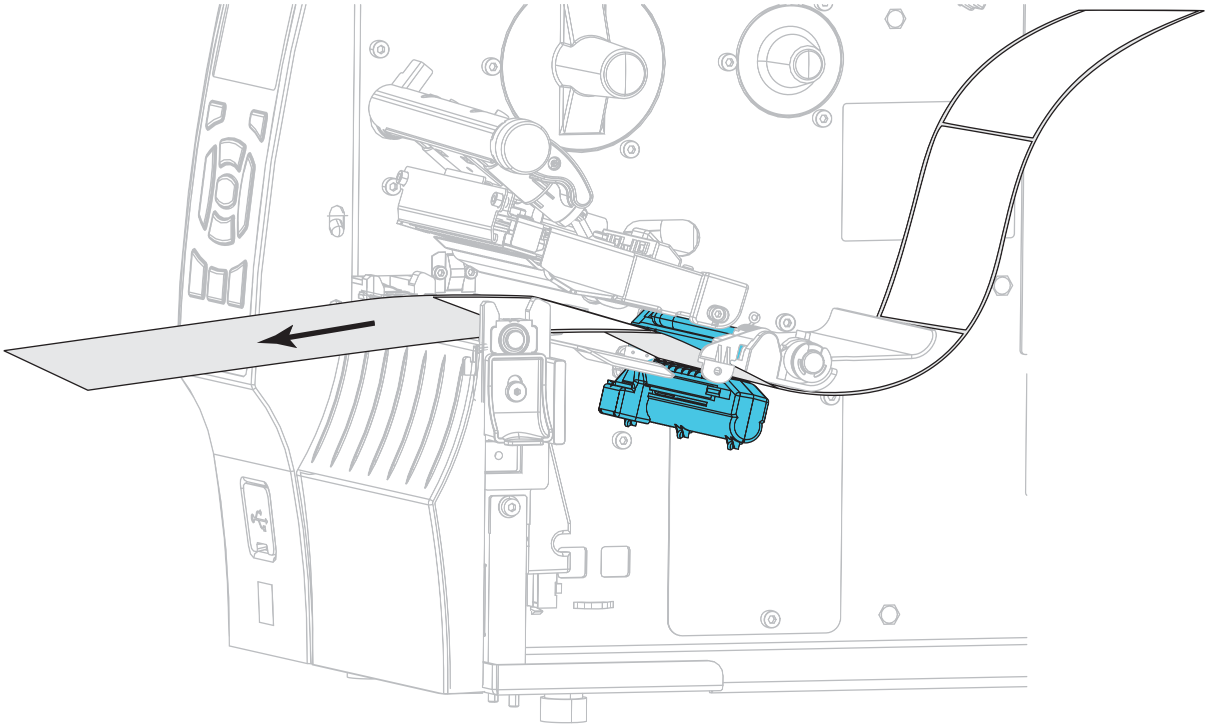
MEDIA/RIBBON CAL

RELOAD ALL
CONTINUE

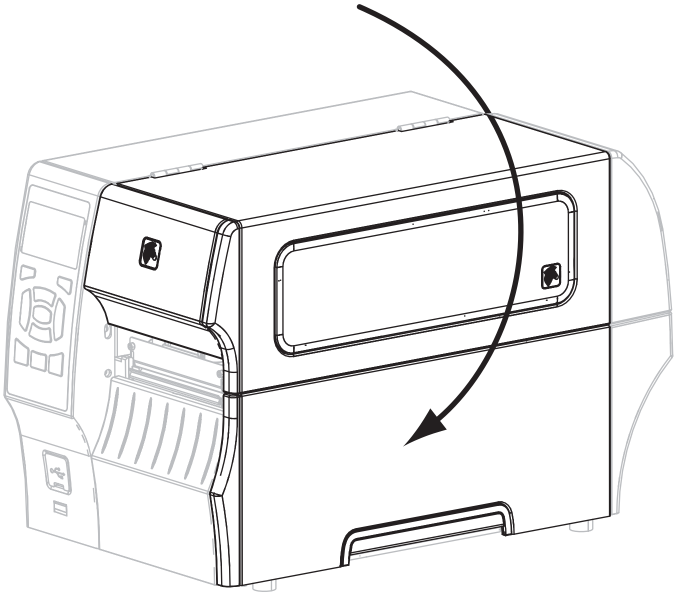
9. Open the printhead assembly by rotating the printhead-open lever.



10. Pull the media forward until a label is positioned under the media sensors.



11. Reload the ribbon (if used).
12. Close the printhead.
13. Close the media door.



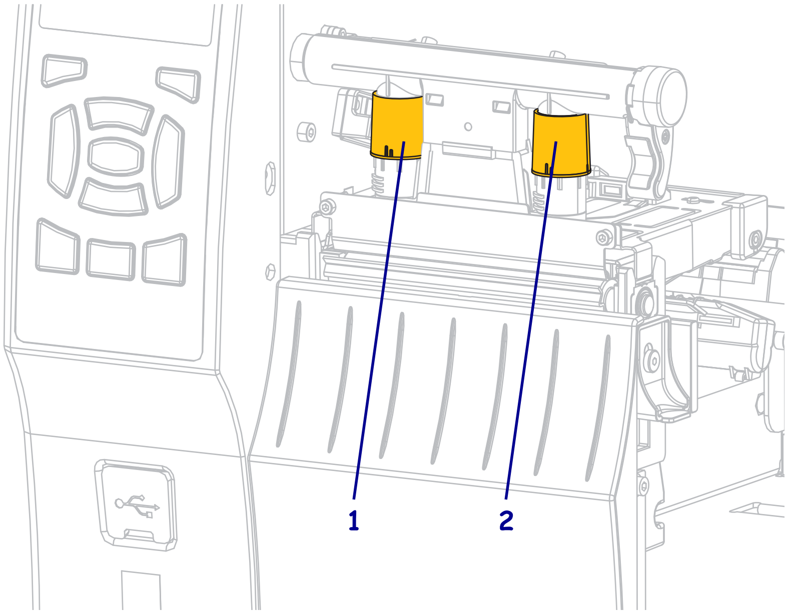
14. Press PAUSE to enable printing.

Adjust the Printhead Pressure

You may need to adjust printhead pressure if printing is too light on one side, if you use thick media, or if the media drifts from side to side during printing. Use the lowest printhead pressure necessary to produce good print quality.

See Figure 3. The printhead pressure adjustment dials have setting marks from 1 to 4.

Figure 3 • Printhead Pressure Adjustment Dials



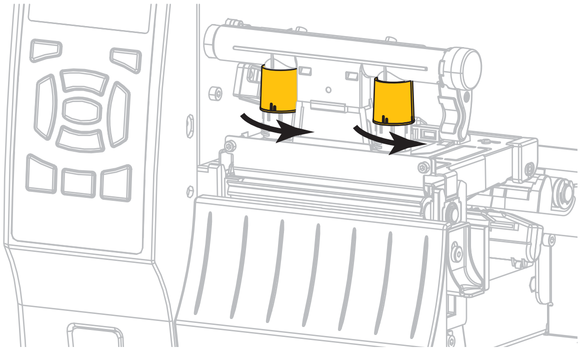
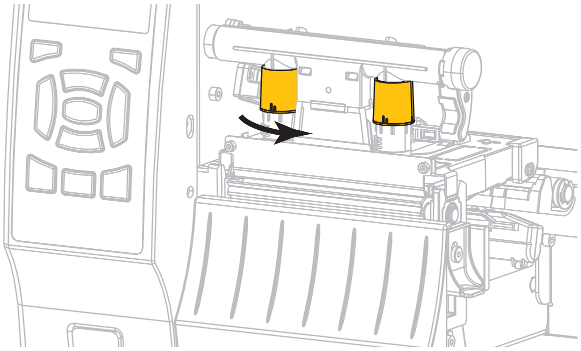
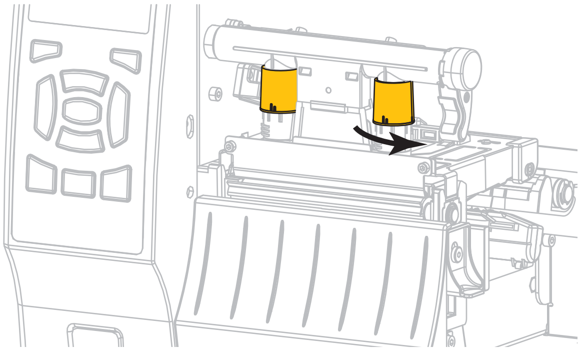
1	Inside dial
2	Outside dial

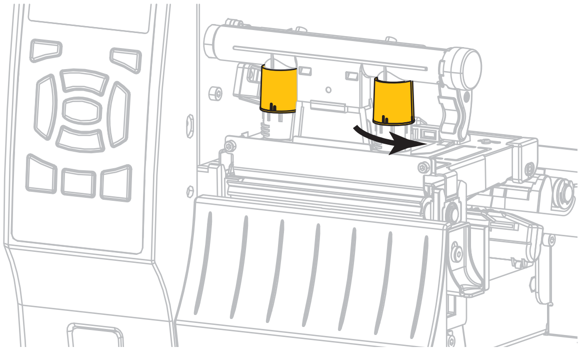
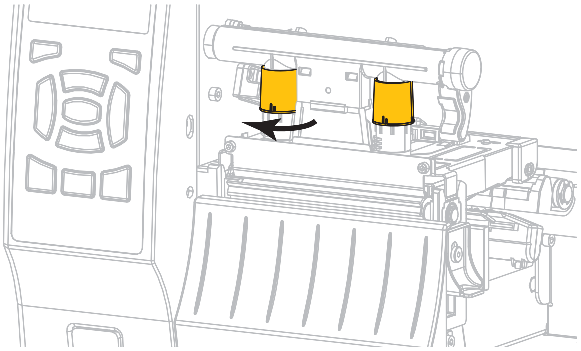
See Table 10. Begin with the following pressure settings, based on your printer and media width, and make adjustments as necessary.

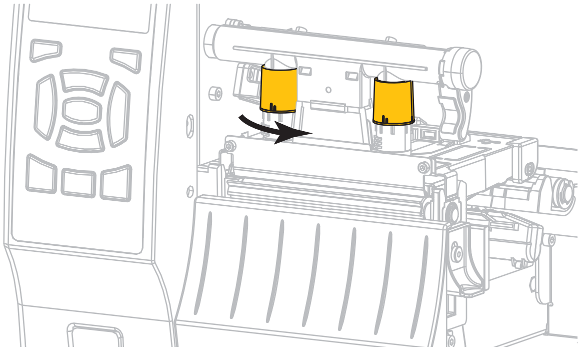
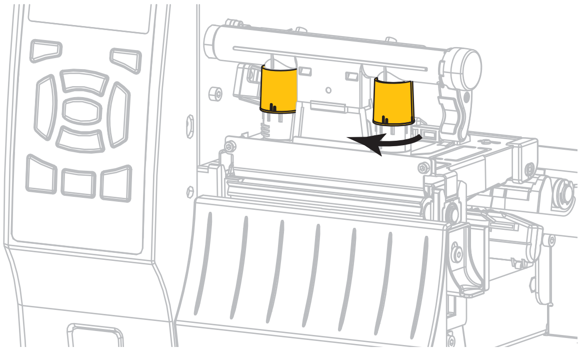
Table 10 • Pressure Setting Starting Points

Printer	Media Width	Inside Dial Setting	Outside Dial Setting
ZT410	1 in. (25 mm)	4	1
	2 in. (51 mm)	3	1
	3 in. (76 mm)	2.5	1.5
	≥ 3.5 in. (89 mm)	2	2
ZT420	2 in. (51 mm)	4	1
	3 in. (76 mm)	3.5	1
	4 in. (102 mm)	3	1.5
	≥ 5 in. (127 mm)	2	2

If necessary, adjust the printhead pressure adjustment dials as follows:

If the media...	Then...
Requires higher pressure to print well	Increase both dials one position. 
Prints too lightly on the left side of the label.	Increase the inside dial setting one position. 
Prints too lightly on the right side of the label.	Increase the outside dial setting one position. 

If the media...	Then...
Shifts left while printing	Increase the outside dial setting one position.  OR Decrease the inside dial setting one position. 

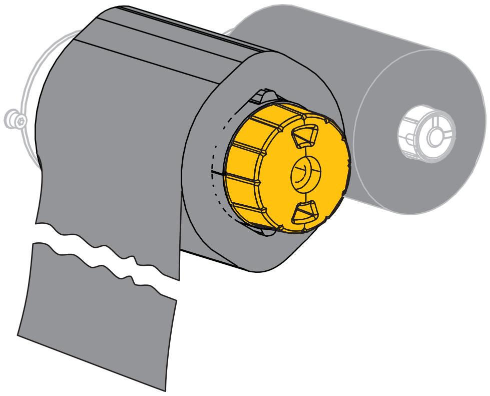
If the media...	Then...
Shifts right while printing	Increase the inside dial setting one position.  OR Decrease the outside dial setting one position. 

Remove Used Ribbon

Remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon.

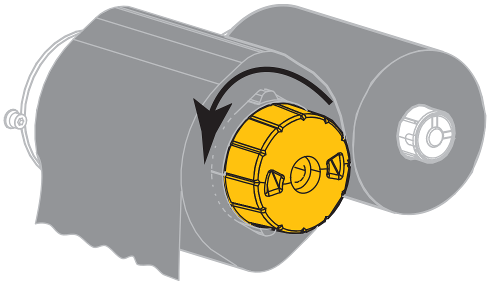
To remove used ribbon, complete these steps:

1. Has the ribbon run out?

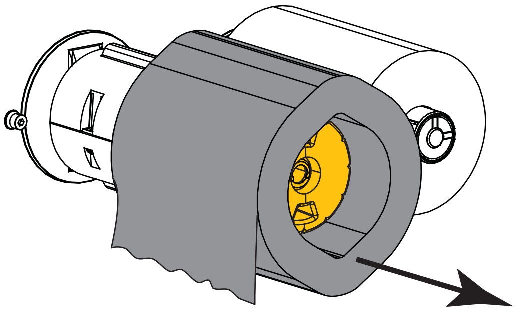
If the ribbon...	Then
Ran out	Continue with the next step.
Did not run out	Cut or break the ribbon before the ribbon take-up spindle.  **Caution •** Do not cut the ribbon directly on the ribbon take-up spindle. Doing so may damage the spindle.

2. While holding the ribbon take-up spindle, turn the ribbon release knob to the left until it stops.

   The ribbon release bars pivot down, easing the spindle’s grip on the used ribbon.



3. Slide the used ribbon off of the ribbon take-up spindle and discard.



Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

Cleaning Schedule and Procedures. 130
    Clean the Exterior, the Media Compartment, and the Sensors 131
    Clean the Printhead and Platen Roller. 132
    Clean the Peel Assembly. 136
    Clean the Cutter Module 140
Replacing Printer Components 144
    Ordering Replacement Parts 144
    Recycling Printer Components 144
Lubrication 144

Cleaning Schedule and Procedures

Routine preventive maintenance is a crucial part of normal printer operation. By taking good care of your printer, you can minimize the potential problems that you might have with it and help to achieve and to maintain your standards for print quality.

Over time, the movement of media or ribbon across the printhead wears through the protective ceramic coating, exposing and eventually damaging the print elements (dots). To avoid abrasion:

- Clean the printhead frequently.
- Minimize printhead pressure and burn temperature (darkness) settings by optimizing the balance between the two.
- When using Thermal Transfer mode, ensure that the ribbon is as wide or wider than the media to prevent exposing the printhead elements to the more abrasive label material.

Important • Zebra is not responsible for damage caused by the use of cleaning fluids on this printer.

Specific cleaning procedures are provided on the following pages. Table 1 shows the recommended cleaning schedule. These intervals are intended as guidelines only. You may have to clean more often, depending upon your application and media.

Table 1 • Recommended Cleaning Schedule

Area		Method	Interval
Printhead		Solvent*	**Direct Thermal Mode:** After every roll of media (or 500 feet of fanfold media). **Thermal Transfer Mode:** After every roll of ribbon.
Platen roller		Solvent*	
Media sensors		Air blow	
Ribbon sensor		Air blow	
Media path		Solvent*	
Ribbon path		Solvent*	
Pinch roller (part of Peel-Off option)		Solvent*	
Cutter module	If cutting continuous, pressure-sensitive media	Solvent*	After every roll of media (or more often, depending upon your application and media).
	If cutting tag stock or label liner material	Solvent* and air blow	After every two or three rolls of media.
Tear-off/peel-off bar		Solvent*	Once a month.
Take-label sensor		Air blow	Once every six months.

* Zebra recommends using Preventive Maintenance Kit (part number 47362). In place of this kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%).

Clean the Exterior, the Media Compartment, and the Sensors

Over time, dust, grime, and other debris may build up on the outside and inside of your printer, particularly in a harsh operating environment.

Printer Exterior

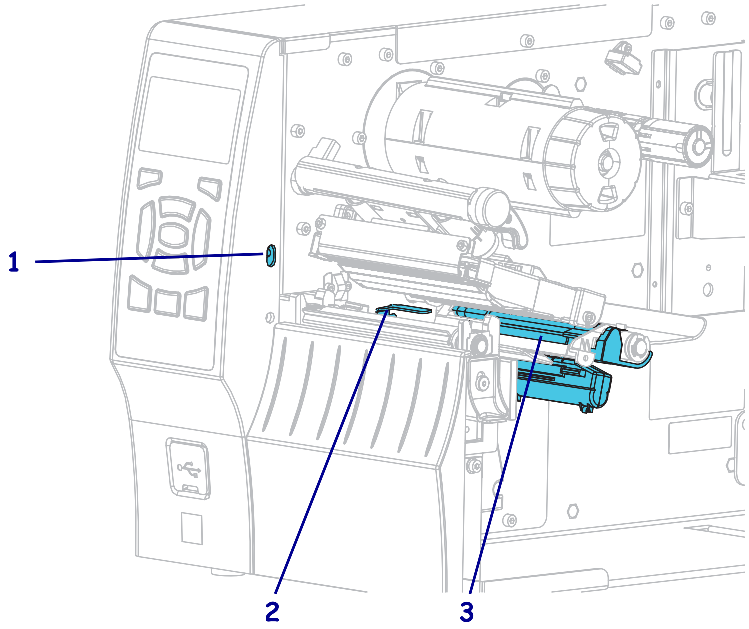
You may clean the exterior surfaces of the printer with a lint-free cloth and a small amount of a mild detergent, if necessary. Do not use harsh or abrasive cleaning agents or solvents.

Important • Zebra is not responsible for damage caused by the use of cleaning fluids on this printer.

Media Compartment and Sensors

To clean the sensors, complete these steps:

1. Brush, air blow, or vacuum any accumulated paper lint and dust away from the media and ribbon paths.
2. Brush, air blow, or vacuum any accumulated paper lint and dust away from the sensors.



1	Take-label sensor
2	Ribbon sensor reflector
3	Media sensor

Clean the Printhead and Platen Roller

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For the recommended cleaning schedule, see Table 1 on page 130.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

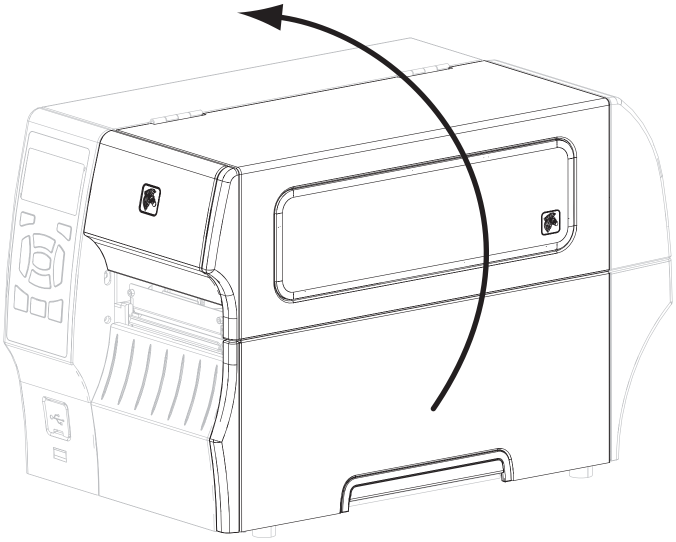
Note • For printers with a peel assembly, keep the peel assembly closed while cleaning the platen roller to reduce the risk of bending the tear-off/peel-off bar.

Caution • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Caution • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an antistatic wriststrap and mat.

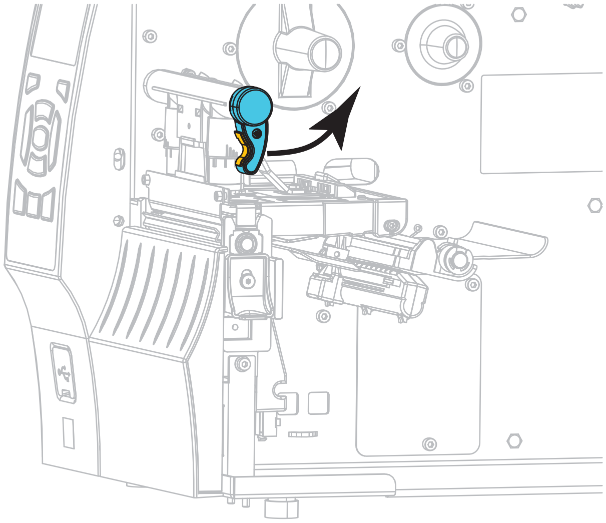
To clean the printhead and platen roller, complete these steps:

1. Raise the media door.



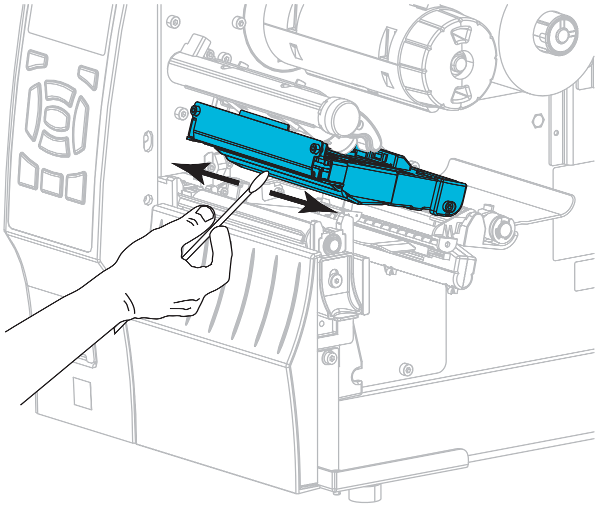
2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

   Open the printhead assembly by rotating the printhead-open lever.

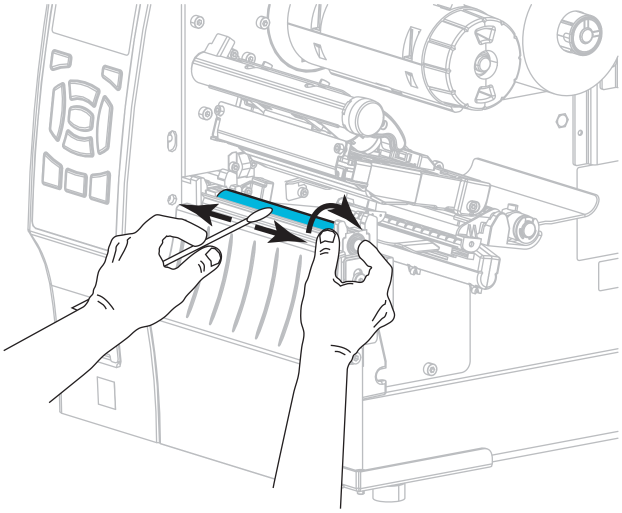


3. Remove the ribbon (if used) and the media.

4. Using the swab from a Zebra Preventive Maintenance Kit, wipe along the brown strip on the printhead assembly from end to end. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

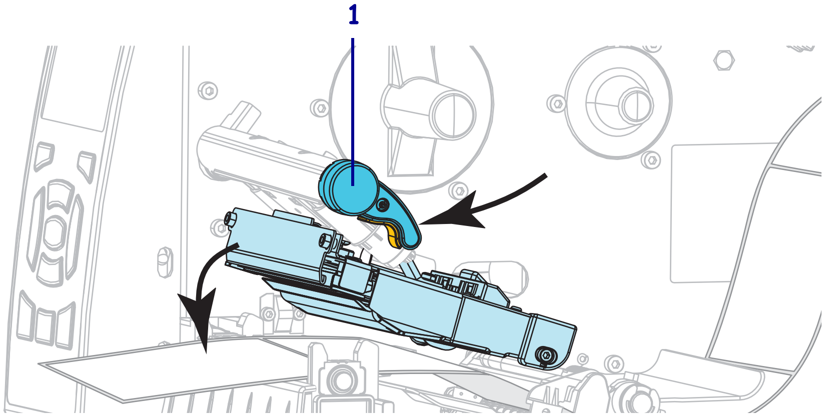


5. While manually rotating the platen roller, clean it thoroughly with the swab. Allow the solvent to evaporate.

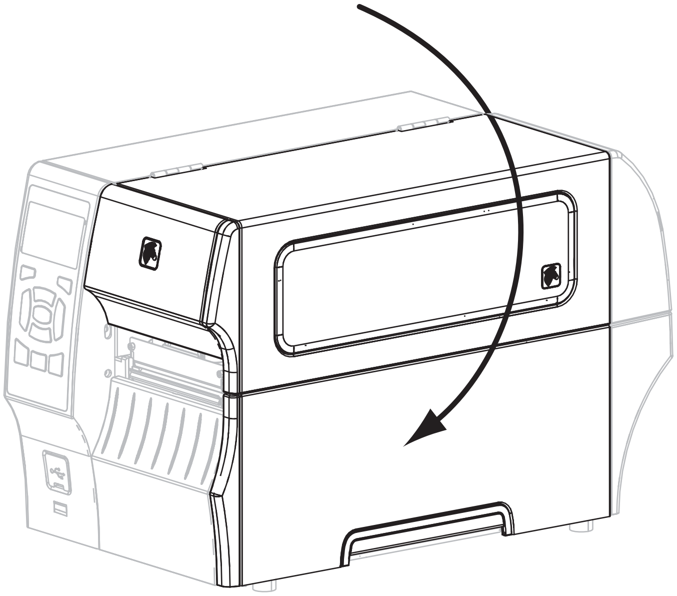


6. Reload the ribbon (if used) and the media. For instructions, see *Load the Ribbon* on page 60 or *Load the Media* on page 34.

7. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



8. Close the media door.



The printer is ready to operate.

9. Press PAUSE to exit pause mode and enable printing.

   The printer may perform a label calibration or feed a label, depending on your settings.

Note • If performing this procedure does not improve print quality, try cleaning the printhead with *Save-A-Printhead* cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller for more information.

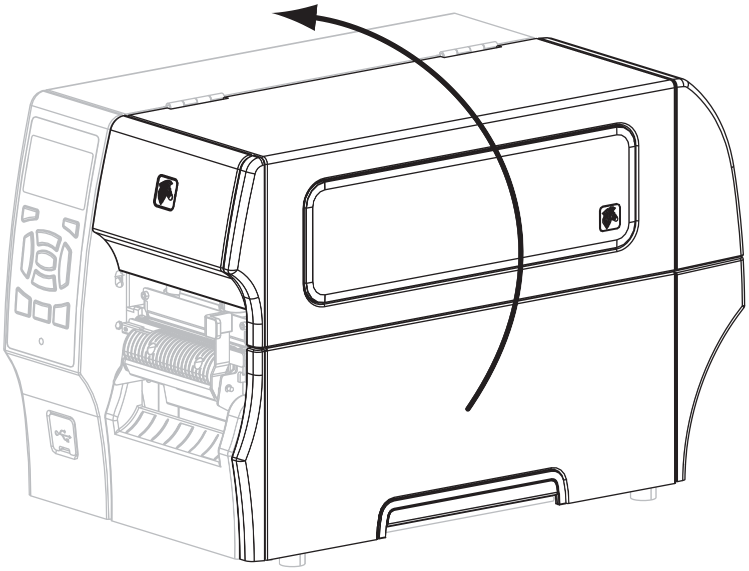
Clean the Peel Assembly

The peel assembly, which is part of the Peel-Off and Liner Take-Up options, consists of several spring-loaded rollers to ensure the proper roller pressure. Clean the pinch roller and tear-off/peel-off bar if adhesive buildup begins to affect peel performance.

Caution • Do not use your left hand to assist in closing the Peel assembly. The top edge of the Peel roller/assembly could pinch your fingers.

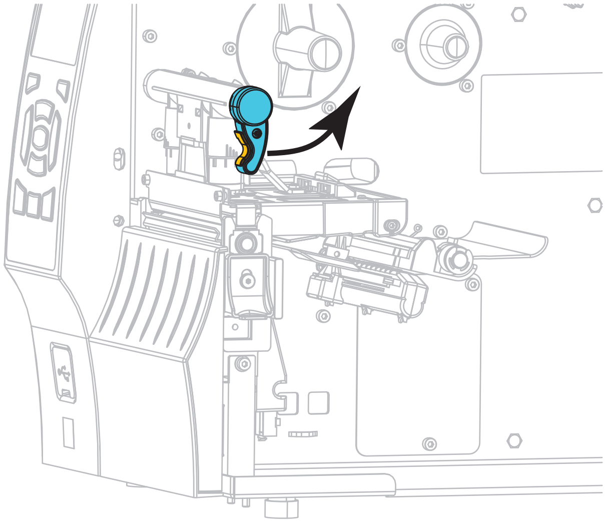
If adhesive buildup affects peel-off performance, complete these steps:

1. Raise the media door.

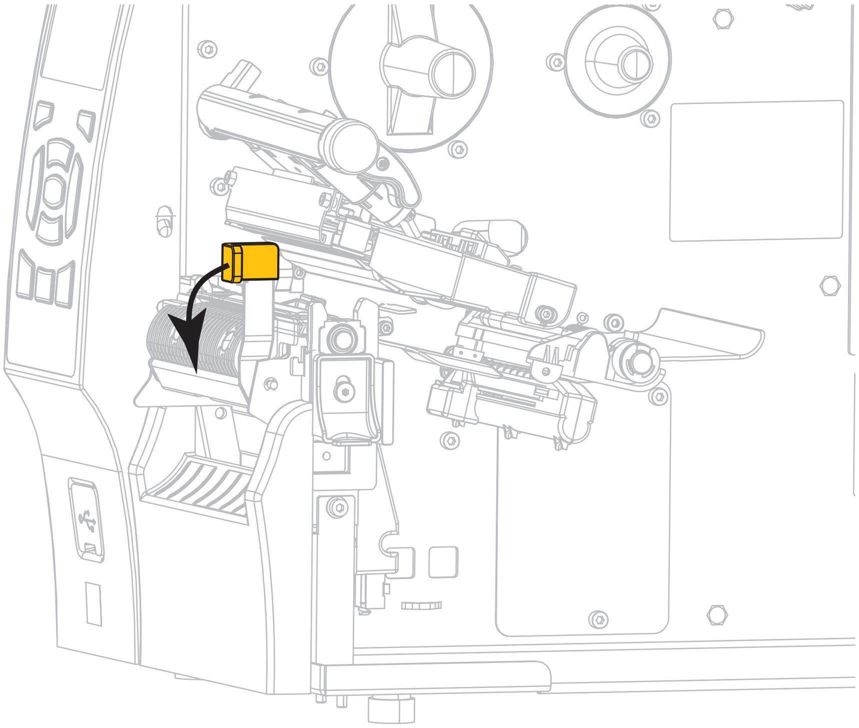


2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

   Open the printhead assembly by rotating the printhead-open lever.

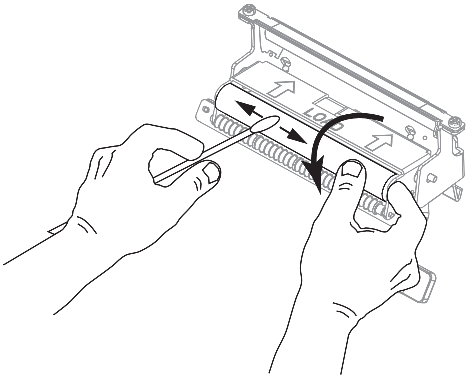


3. Push down the peel-off mechanism release lever to open the peel assembly.



4. Remove any media liner to expose the pinch roller.

5. While manually rotating the pinch roller, clean it thoroughly with the swab from the Preventive Maintenance Kit (part number 47362). In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



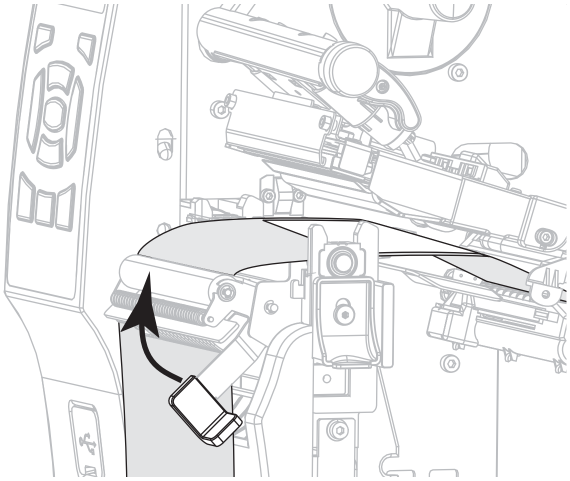
6. Use the swab to remove excess adhesive from the tear-off/peel-off bar. Allow the solvent to evaporate.

Important • Apply minimum force when cleaning the tear-off/peel-off bar. Excessive force can cause the tear-off/peel-off bar to bend, which could have a negative effect on peel performance.

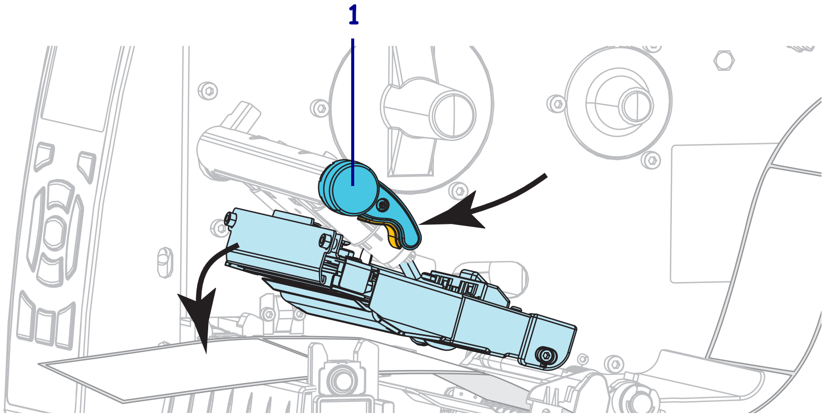
7. Reload the media liner through the peel mechanism. For instructions, see *Final Steps for Peel-Off Mode (with or without Liner Take-Up)* on page 42.

8. **Caution** • Use the peel release lever and your right hand to close the peel assembly. Do not use your left hand to assist in closing. The top edge of the peel roller/assembly could pinch your fingers.

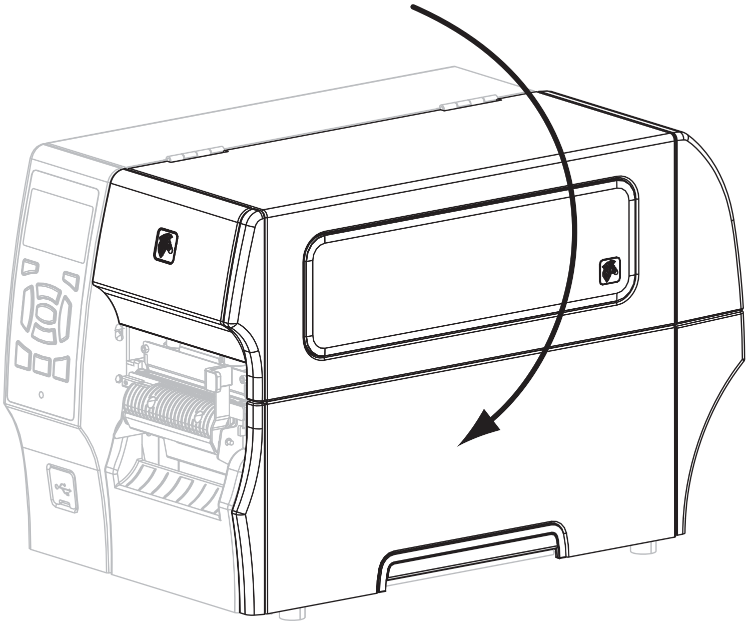
Close the peel assembly using the peel-off mechanism release lever.



9. Rotate the printhead-open lever (**1**) downward until it locks the printhead in place.



10. Close the media door.



The printer is ready to operate.

11. Press PAUSE to exit pause mode and enable printing.

The printer may perform a label calibration or feed a label, depending on your settings.

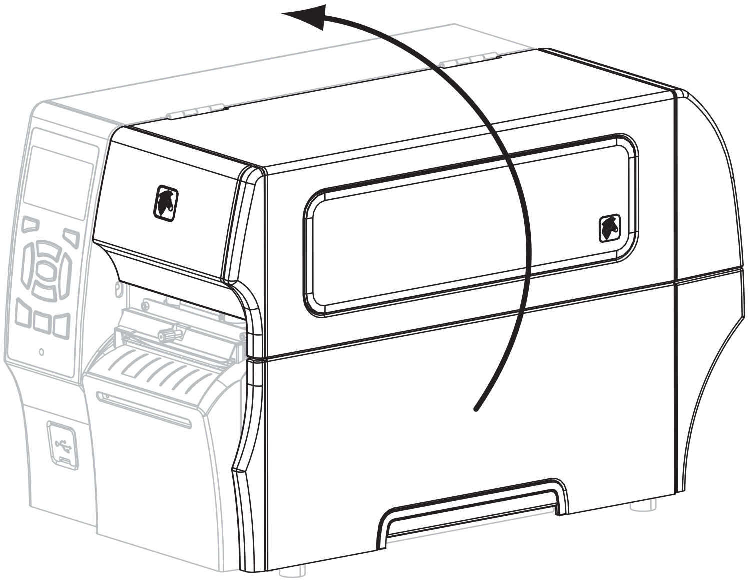
Clean the Cutter Module

If the cutter is not cutting the labels cleanly or if it jams with labels, clean the cutter.

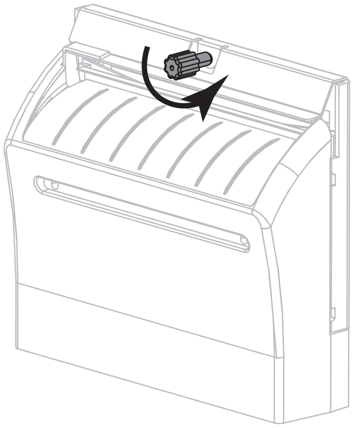
Caution • For personnel safety, always power off and unplug the printer before performing this procedure.

To clean the cutter module, complete these steps:

1. Turn the printer off (**O**), and unplug the printer from its power source.
2. Raise the media door.

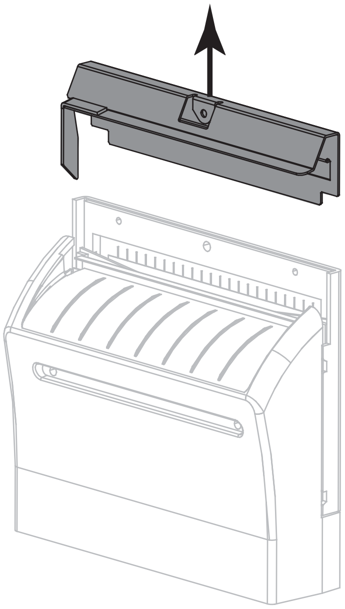


3. Remove media that is loaded through the cutter module.
4. Loosen and remove the thumbscrew and lock washer on the cutter shield.

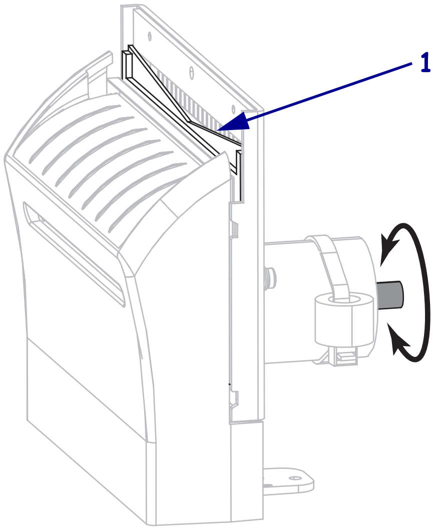


5. **Caution •** The cutter blade is sharp. Do not touch or rub the blade with your fingers.

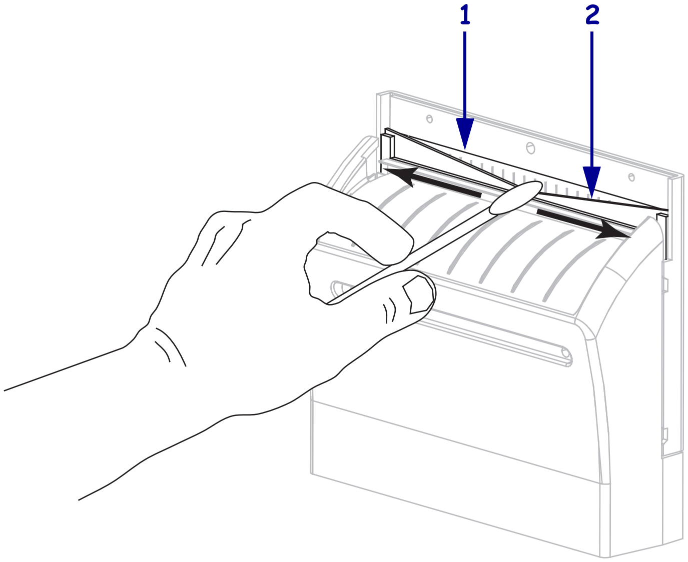
   Remove the cutter shield.



6. If necessary, rotate the cutter motor thumbscrew to fully expose the V-shaped cutter blade (1).



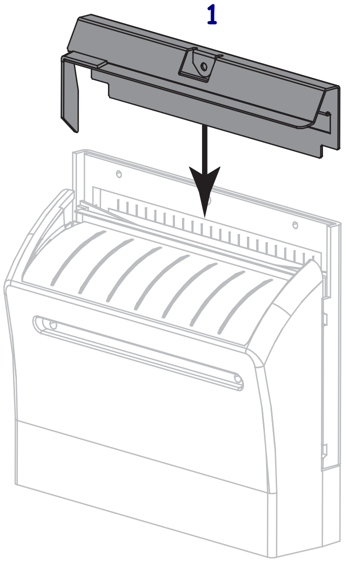
7. Using the swab from the Preventive Maintenance Kit (part number 47362), wipe along the upper cutting surface (**1**) and the cutter blade (**2**). In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

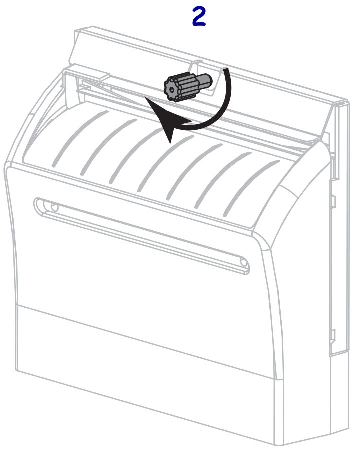


8.

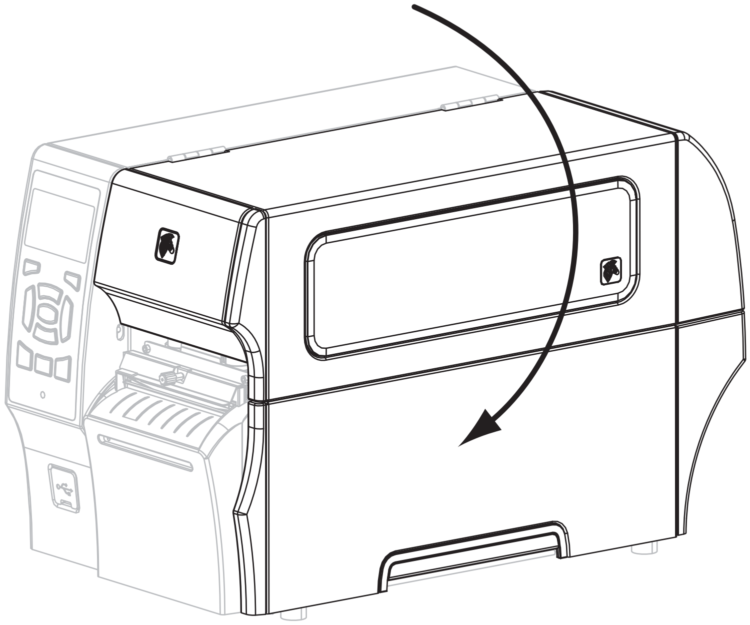
Caution • The cutter blade is sharp. For operator safety, replace the cutter shield.

Replace the cutter shield (**1**) and secure it with the thumbscrew and lock washer that you removed earlier (**2**).





9. Close the media door.



10. Plug the printer into its power source, and then turn on (**I**) the printer.

The cutter blade returns to its operating position.

11. If the cutter continues to perform unsatisfactorily, contact an authorized service technician.

Replacing Printer Components

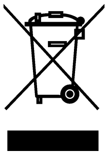
Some printer components, such as the printhead and platen roller, may wear out over time and can be replaced easily. Regular cleaning may extend the life of some of these components. See Table 1 on page 130 for the recommended cleaning intervals.

Ordering Replacement Parts

For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra™ supplies as part of the total solution. Specifically, the ZT400 Series printers are designed to work only with genuine Zebra™ printheads, thus maximizing safety and print quality.

Contact your authorized Zebra reseller for part ordering information.

Recycling Printer Components



The majority of this printer's components are recyclable. The printer's main logic board may include a battery that you should dispose of properly.

Do not dispose of any printer components in unsorted municipal waste. Please dispose of the battery according to your local regulations, and recycle the other printer components according to your local standards. For more information, see http://www.zebra.com/environment.

Lubrication

No lubrication is needed for this printer.

Caution • Some commercially available lubricants will damage the finish and the mechanical parts if used on this printer.

5

Troubleshooting

This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.

Contents

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  CANCEL Self Test 163
  PAUSE Self Test 164
  FEED Self Test. 165
  FEED + PAUSE Self Test. 168
  CANCEL + PAUSE Self Test 168
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  Sensor Profile 170

Meaning of Indicator Lights

The indicator lights on the control panel show the current status of the printer (Table 1).

Table 1 • Status of Printer As Shown by Indicator Lights

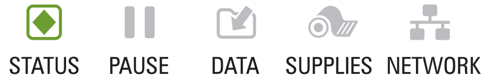
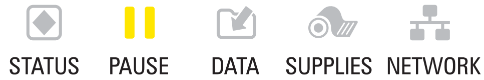
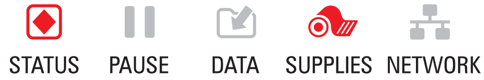
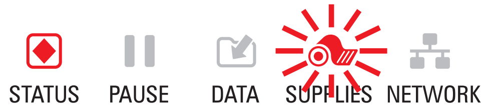
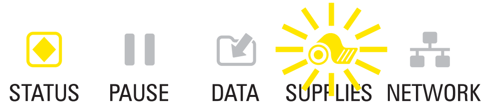
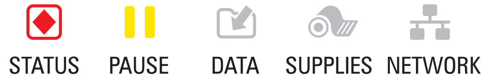
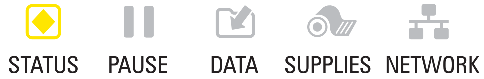
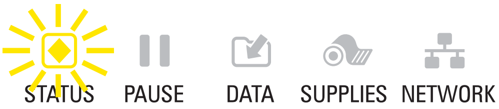
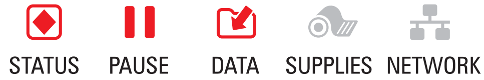
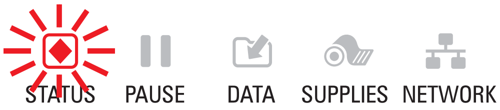
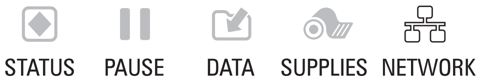
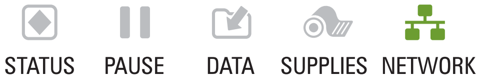
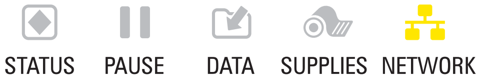
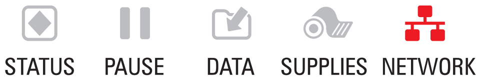
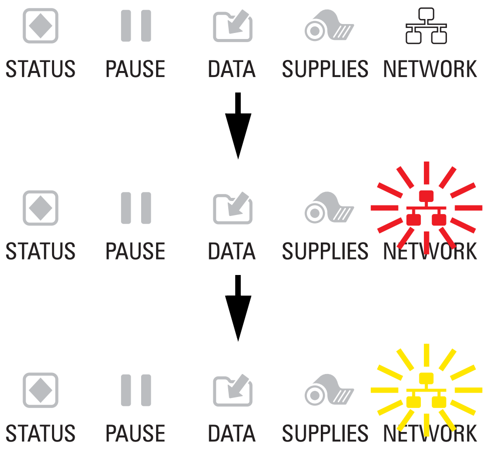
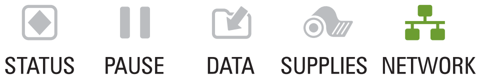
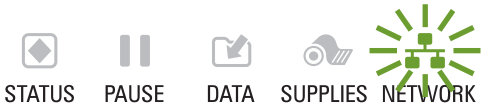
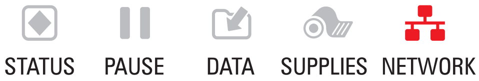
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady green (other lights steady yellow for 2 seconds during printer power-up)* The printer is ready.
 STATUS PAUSE DATA SUPPLIES NETWORK	*PAUSE light steady yellow.* The printer is paused.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady red* *SUPPLIES light steady red* The media supply is out. The printer needs attention and cannot continue without user intervention.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady red* *SUPPLIES light flashing red* The ribbon supply is out. The printer needs attention and cannot continue without user intervention.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady yellow* *SUPPLIES light flashing yellow* The printer is in Direct Thermal mode, which does not require ribbon; however, ribbon is installed in the printer.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady red* *PAUSE light steady yellow* The printhead is open. The printer needs attention and cannot continue without user intervention.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady yellow* The printhead is over temperature. ⚠ **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light flashing yellow* This indicator light flashing indicates one of the following: • The printhead is under temperature. • The power supply is over temperature. • The main logic board (MLB) is over temperature.
 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light steady red* *PAUSE light steady red* *DATA light steady red* The printhead was replaced with one that is not a genuine Zebra™ printhead. Install a genuine Zebra™ printhead to continue.

Table 1 • Status of Printer As Shown by Indicator Lights (Continued)

 STATUS PAUSE DATA SUPPLIES NETWORK	*STATUS light flashing red* The printer is unable to read the dpi setting of the printhead.
Printers with a ZebraNet wired Ethernet option	
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light off* No Ethernet link is available.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light steady green* A 100 Base link was found.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light steady yellow* A 10 Base link was found.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light steady red* An Ethernet error condition exists. The printer is not connected to your network.
Printers with a ZebraNet wireless option	
 STATUS PAUSE DATA SUPPLIES NETWORK STATUS PAUSE DATA SUPPLIES NETWORK STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light off* A radio was found during power-up. The printer is attempting to associate with the network. The light flashes red while the printer associates with the network. The light then flashes yellow while the printer is authenticating with the network.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light steady green* The radio is associated with your network and authenticated, and the WLAN signal is strong.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light flashing green* WLAN—The radio is associated with your network and authenticated, but the WLAN signal is weak.
 STATUS PAUSE DATA SUPPLIES NETWORK	*NETWORK light steady red* A WLAN error condition exists. The printer is not connected to your network.

Printing Issues

Table 2 identifies possible issues with printing or print quality, the possible causes, and the recommended solutions.

Table 2 • Printing Issues

Issue	Possible Cause	Recommended Solution
General print quality issues	The printer is set at the incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. You may want to perform the *FEED Self Test* on page 165 to determine the optimal settings for your printer. See *Print Speed* on page 67 for how to change the print speed.
	You are using an incorrect combination of labels and ribbon for your application.	**1.** Switch to a different type of media or ribbon to try to find a compatible combination. **2.** If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	The printer is set at an incorrect darkness level.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test* on page 165 to determine the ideal darkness setting. See *Print Darkness* on page 67 for how to change the darkness setting.
	The printhead is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 132.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 124.
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 132.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned. See *Load the Media* on page 34.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 67.
	The media is loaded incorrectly.	Load media correctly. See *Load the Media* on page 34.
Long tracks of missing print on several labels	Print element damaged.	Call a service technician.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in *Ribbon Problems* on page 151.

Table 2 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in *Ribbon Problems* on page 151.
Printing too light or too dark over the entire label	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
	You are using an incorrect combination of media and ribbon for your application.	**1.** Switch to a different type of media or ribbon to try to find a compatible combination. **2.** If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	You are using ribbon with direct thermal media.	Direct thermal media does not require ribbon. To determine if you are using direct thermal media, perform the label scratch test in *When to Use Ribbon* on page 18.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 124.
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
Misregistration/skips labels	The printer is not calibrated.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.
	Improper label format.	Check your label format and correct it as necessary.
Misregistration and misprint of one to three labels	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 132.
	Media does not meet specifications.	Use media that meets specifications. See *Media Specifications* on page 176.
Vertical drift in top-of-form position	The printer is out of calibration.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.
	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 132.

Table 2 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Set the printer for the correct media type (gap/notch, continuous, or mark—see *Media Type* on page 67) and calibrate the printer, if necessary (see *Calibrate the Ribbon and Media Sensors* on page 119).
	The media sensor is calibrated improperly.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.
	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 132.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality. See *Adjust the Printhead Pressure* on page 124.
	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See *Load the Ribbon* on page 60 and *Load the Media* on page 34.
	Incompatible media.	You must use media that meets the printer specifications. Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed (see *Media Specifications* on page 176).
The bar code printed on a label does not scan.	The bar code is not within specifications because the print is too light or too dark.	Perform the *FEED Self Test* on page 165. Adjust the darkness or print speed settings as necessary.
	There is not enough blank space around the bar code.	Leave at least 1/8 in. (3.2 mm) between the bar code and other printed areas on the label and between the bar code and the edge of the label.
Auto Calibrate failed.	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See *Load the Ribbon* on page 60 and *Load the Media* on page 34.
	The sensors could not detect the media or ribbon.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 67.

Ribbon Problems

Table 3 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

Table 3 • Ribbon Problems

Problem	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	1. Reduce the darkness setting. See *Print Darkness* on page 67 for how to change the darkness setting. 2. Clean the printhead thoroughly. See *Clean the Printhead and Platen Roller* on page 132.
	The ribbon is coated on the wrong side and cannot be used in this printer.	Replace the ribbon with one coated on the correct side. For more information, see *Coated Side of Ribbon* on page 18.
Wrinkled ribbon	Ribbon was loaded incorrectly.	Load the ribbon correctly. See *Load the Ribbon* on page 60.
	Incorrect burn temperature.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test* on page 165 to determine the ideal darkness setting. See *Print Darkness* on page 67 for how to change the darkness setting.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 124.
	Media not feeding properly; "walking" from side to side.	Make sure that media is snug by adjusting the media guide, or call a service technician.
	The printhead or platen roller may be installed incorrectly.	Call a service technician.
The printer does not detect when the ribbon runs out.	The printer may have been calibrated without ribbon. Later, ribbon was inserted without the user recalibrating the printer or loading printer defaults.	Calibrate the printer, this time using ribbon, or load printer defaults. See *Calibrate the Ribbon and Media Sensors* on page 119 or *Load Defaults* on page 74.
In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.		
The printer indicates that ribbon is out, even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.

RFID Problems

Table 4 identifies problems that may occur with RFID printers, the possible causes, and the recommended solutions. For more information about RFID, refer to the *RFID Programming Guide 3*. A copy of the manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.

Table 4 • RFID Problems

Problem	Possible Cause	Recommended Solution
The RFID-enabled printer voids every label.	The printer is not calibrated for the media being used.	Manually calibrate the printer (see *Calibrate the Ribbon and Media Sensors* on page 119).
	You are using an RFID label with a tag type that is not supported by your printer.	The ZT400 series printers support only Gen 2 RFID labels. For more information, refer to the *RFID Programming Guide 3,* or contact an authorized Zebra RFID reseller.
	The printer is unable to communicate with the RFID reader.	**1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized Zebra RFID service technician for assistance.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers or other RF sources. • Make sure that the media door is closed at all times during RFID programming.
	The settings are incorrect in your label designer software.	The software settings override the printer settings. Make sure that the software and printer settings match.
	You are using an incorrect programming position, particularly if the tags being used are within printer specifications.	Do one or more of the following as necessary: • Check the RFID programming position , or the program position setting in your label designer software. If the position is incorrect, change the setting. • Restore the RFID programming position back to the default value. For more information, refer to the *RFID Programming Guide 3*. For transponder placement details, go to http://www.zebra.com/transponders.
	You are sending RFID ZPL or SGD commands that are incorrect.	Check your label formats. For more information, refer to the *RFID Programming Guide 3*.

Table 4 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
Low yields. Too many RFID tags per roll are voided.	The RFID labels are not within specifications for the printer, which means that the transponder is not in an area that can be programmed consistently.	Make sure that the labels meet transponder placement specifications for your printer. See http://www.zebra.com/transponders for transponder placement information. For more information, refer to the *RFID Programming Guide 3*, or contact an authorized Zebra RFID reseller.
	Incorrect read and write power levels for the RFID tag type.	Change the RFID read and write power levels. For instructions, refer to the *RFID Programming Guide 3*.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers. • Make sure that the media door is closed at all times during RFID programming.
	The printer is using outdated printer firmware and reader firmware versions.	Go to http://www.zebra.com/firmware for updated firmware.
The printer stops at the RFID inlay.	The printer calibrated the label length only to the RFID inlay instead of to the interlabel gap.	**1.** Select FEED for the `MEDIA POWER UP` and `HEAD CLOSE` parameters (see *Power-Up Action* on page 72 or *Head-Close Action* on page 73). **2.** Manually calibrate the printer (see *Calibrate the Ribbon and Media Sensors* on page 119).
The DATA light flashes indefinitely after you attempt to download printer or reader firmware.	The download was not successful. For best results, cycle power on the printer before downloading any firmware.	**1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** Attempt to download the firmware again. **5.** If the problem persists, contact Technical Support.

Table 4 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
RFID parameters do not appear in Setup mode, and RFID information does not appear on the printer configuration label. **The printer does not void RFID labels that are not programmed correctly.**	The printer was powered off (**O**) and then back on (**I**) too quickly for the RFID reader to initialize properly.	Wait at least 10 seconds after turning the printer power off before turning it back on. **1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** Check for the RFID parameters in Setup mode or for RFID information on a new configuration label.
	An incorrect version of printer or reader firmware was loaded on the printer.	**1.** Verify that the correct firmware version is loaded on your printer. For more information, refer to the *RFID Programming Guide 3*. **2.** Download the correct printer or reader firmware if necessary. **3.** If the problem persists, contact Technical Support.
	The printer is unable to communicate with the RFID subsystem.	**1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized service technician for assistance.

Error Messages

The control panel displays messages when there is an error. See Table 5 for errors, the possible causes, and the recommended solutions.

QuickHelp Pages Most error messages will include the option to view a QuickHelp page. The lower right-hand corner of the message displays “QR.”

To access a QuickHelp page from an error message, do the following:

1. Press RIGHT SELECT to select QR.

   The printer displays a QuickHelp page specific to that error message. This page includes a QR code.

2. Scan the QR code with a smartphone.

   Your phone accesses either a video specific to that error message or the Zebra support page for your printer.

Table 5 • Error Messages

Display/ Indicator Lights	Possible Cause	Recommended Solution
HEAD OPEN CLOSE HEAD STATUS light steady red PAUSE light steady yellow	The printhead is not fully closed.	Close the printhead completely.
	The printhead open sensor is not working properly.	Call a service technician to replace the sensor.
MEDIA OUT LOAD MEDIA STATUS light steady red SUPPLIES light steady red	The media is not loaded or is loaded incorrectly.	Load media correctly. See *Load the Media* on page 34.
	Misaligned media sensor.	Check the position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	**1.** Install the proper media type, or reset printer for the current media type. **2.** Calibrate the printer. See *Media and Ribbon Sensor Calibration* on page 75.
WARNING RIBBON IN STATUS light steady yellow SUPPLIES light flashing yellow	Ribbon is loaded, but the printer is set for direct thermal mode.	Ribbon is not required with direct thermal media. If you are using direct thermal media, remove the ribbon. This error message will not affect printing.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See *Print Method* on page 68.

Table 5 • Error Messages (Continued)

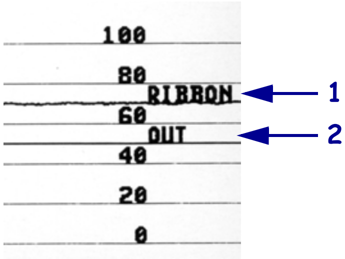
Display/ Indicator Lights	Possible Cause	Recommended Solution
ALERT RIBBON OUT STATUS light steady yellow SUPPLIES light flashing yellow	In thermal transfer mode: - ribbon is not loaded - ribbon is loaded incorrectly - the ribbon sensor is not detecting ribbon - media is blocking the ribbon sensor	**1.** Load ribbon correctly. See *Load the Ribbon* on page 60. **2.** Calibrate the printer. See *Media and Ribbon Sensor Calibration* on page 75.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	**1.** Print a sensor profile (see *Print Information* on page 71). The ribbon out threshold (**2**) is likely too high, above the line that indicates where the ribbon is detected (**1**).  **2.** Calibrate the printer (see *Media and Ribbon Sensor Calibration* on page 75) or load printer defaults (see *Load Defaults* on page 74).
	If you are using direct thermal media, the printer is waiting for ribbon to be loaded because it is incorrectly set for thermal transfer mode.	Set the printer for Direct Thermal mode. See *Print Method* on page 68.
PH NOT AUTHENTICATED REPLACE PRINTHEAD STATUS light steady red PAUSE light steady red DATA light steady red	The printhead was replaced with one that is not a genuine Zebra™ printhead.	Install a genuine Zebra™ printhead.

Table 5 • Error Messages (Continued)

Display/ Indicator Lights	Possible Cause	Recommended Solution
PRINT HEAD OVERTEMP PRINTING HALTED	**Caution •** The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
STATUS light steady yellow	The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature. If this error persists, consider changing where the printer is located or using a slower print speed.
HEAD COLD PRINTING HALTED THERMISTOR REPLACE PRINTHEAD	**Caution •** An improperly connected printhead data or power cable can cause these error messages. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
STATUS light steady yellow The printer shows one of these messages or cycles between them.	The printhead data cable is not properly connected.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.
HEAD COLD PRINTING HALTED	**Caution •** An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
STATUS light flashing yellow	The printhead temperature is approaching its lower operating limit.	Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the printer to a warmer area.
	The printhead data cable is not properly connected.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.

Table 5 • Error Messages (Continued)

Display/ Indicator Lights	Possible Cause	Recommended Solution
CUT ERROR	**Caution •** The cutter blade is sharp. Do not touch or rub the blade with your fingers.	
STATUS light steady red PAUSE light steady yellow	The cutter blade is in the media path.	Turn off the printer power and unplug the printer. Inspect the cutter module for debris and clean as needed following the cleaning instructions in *Clean the Cutter Module* on page 140.
OUT OF MEMORY STORING GRAPHIC OUT OF MEMORY STORING FORMAT OUT OF MEMORY STORING BITMAP OUT OF MEMORY STORING FONT	There is not enough memory to perform the function specified on the second line of the error message.	Free up some of the printer's memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See *Print Width* on page 69.
		Ensure that the data is not directed to a device that is not installed or is unavailable.
		If the problem persists, call a service technician.

Communications Problems

Table 6 identifies problems with communications, the possible causes, and the recommended solutions.

Table 6 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized. The DATA light does not flash.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
		If you are using serial communication, check the serial port settings. See *PORTS Menu* on page 115.
		If you are using serial communication, make sure that you are using a null modem cable or a null modem adapter.
		Check the printer's handshake protocol setting. The setting used must match the one being used by the host computer. See *Host Handshake* on page 88.
		If a driver is used, check the driver communication settings for your connection.
A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.	The serial communication settings are incorrect.	Ensure that the flow control settings match.
		Check the communication cable length. See Table 2 on page 25 for requirements.
		Check the printer driver or software communications settings (if applicable).
A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.	The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See *Command Character* on page 84 and *Delimiter Character* on page 84.
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.
		If the problem continues, check the label format.

Miscellaneous Issues

Table 7 identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions.

Table 7 • Miscellaneous Printer Problems

Problem	Possible Cause	Recommended Solution
The control panel display shows a language that I cannot read	The language parameter was changed through the control panel or a firmware command.	1. On the control panel display, scroll to LANGUAGE Menu. 2. Press OK to access the items in this menu. 3. Use the UP ARROW or DOWN ARROW to scroll through the language selections. The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read. 4. Select the language that you want to display.
The display is missing characters or parts of characters	The display may need replacing.	Call a service technician.
Changes in parameter settings did not take effect	Some parameters are set incorrectly.	1. Check the parameters and change or reset if necessary. 2. Turn the printer off (**O**) and then on (**I**).
	A firmware command turned off the ability to change the parameter.	Refer to the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* or call a service technician.
	A firmware command changed the parameter back to the previous setting.	
	If the problem persists, there may be a problem with the main logic board.	Call a service technician.
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 119.
	The printer is configured for continuous media.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 67.
All indicator lights are on, nothing is on the display (if the printer has a display), and the printer locks up.	Internal electronic or firmware failure.	Call a service technician.
The printer locks up while running the Power-On Self Test.	Main logic board failure.	Call a service technician.

Table 7 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
The printer is not acknowledging a USB device or is not reading the files on a USB device that is plugged into the USB host port.	The printer currently supports USB drives only up to 1 TB in size.	Use a USB drive that is 1 TB or smaller.
	The USB drive may require its own external power.	If your USB drive requires external power, make sure that it is plugged into a working power supply.

Printer Diagnostics

Self tests and other diagnostics provide specific information about the condition of the printer. The self tests produce sample printouts and provide specific information that helps determine the operating conditions for the printer.

Important • Use full-width media when performing self tests. If your media is not wide enough, the test labels may print on the platen roller. To prevent this from happening, check the print width, and ensure that the width is correct for the media that you are using.

Each self test is enabled by pressing a specific control panel key or combination of keys while turning on (**I**) the printer power. Keep the key(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the Power-On Self Test.

Note •

- When performing these self tests, do not send data to the printer from the host.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- When canceling a self test prior to its actual completion, always reset the printer by turning it off (**O**) and then on (**I**).

Power-On Self Test

A Power-On Self Test (POST) is performed each time the printer is turned on (**I**). During this test, the control panel lights (LEDs) turn on and off to ensure proper operation. At the end of this self test, only the STATUS LED remains lit. When the Power-On Self Test is complete, the media is advanced to the proper position.

To initiate the Power-On Self Test, complete these steps:

1. Turn on (**I**) the printer.

   The POWER LED illuminates. The other control panel LEDs and the LCD monitor the progress and indicate the results of the individual tests. All messages during the POST display in English; however, if the test fails, the resulting messages cycle through the international languages as well.

CANCEL Self Test

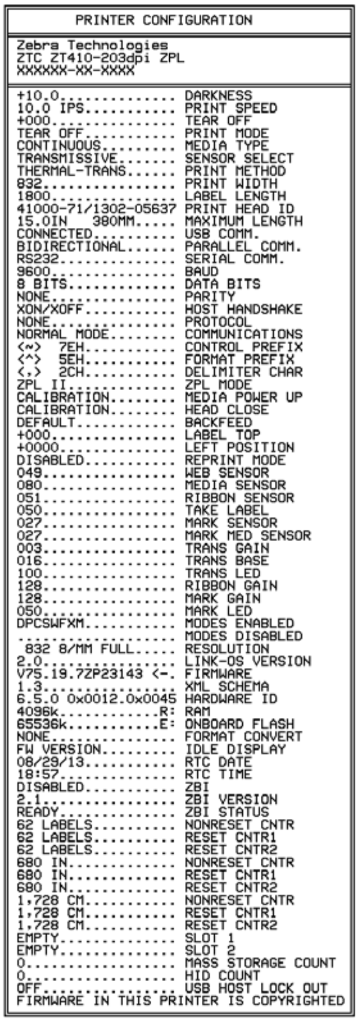
The CANCEL self test prints a printer configuration label and a network configuration label. For other ways to print these labels, see *Print Information* on page 71.

To perform the CANCEL Self Test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold CANCEL while turning on (**I**) the printer. Hold CANCEL until the first control panel light turns off.

   The printer prints a printer configuration label (Figure 1) and then a network configuration label (Figure 2).

Figure 1 • Sample Printer Configuration Label

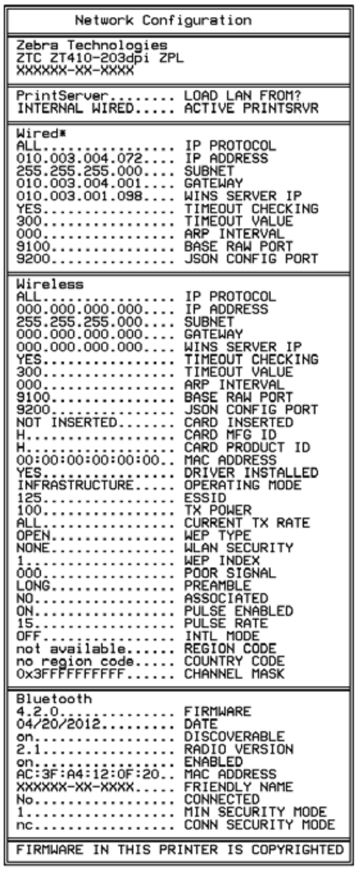


```
         PRINTER CONFIGURATION

Zebra Technologies
ZTC ZT410-203dpi ZPL
XXXXXX-XX-XXXX

+10.0.............. DARKNESS
10.0 IPS........... PRINT SPEED
+000............... TEAR OFF
TEAR OFF........... PRINT MODE
CONTINUOUS......... MEDIA TYPE
TRANSMISSIVE....... SENSOR SELECT
THERMAL-TRANS...... PRINT METHOD
832................ PRINT WIDTH
1800............... LABEL LENGTH
41000-71/1302-05637 PRINT HEAD ID
15.0IN   380MM..... MAXIMUM LENGTH
CONNECTED.......... USB COMM.
BIDIRECTIONAL...... PARALLEL COMM.
RS232.............. SERIAL COMM.
9600............... BAUD
8 BITS............. DATA BITS
NONE............... PARITY
XON/XOFF........... HOST HANDSHAKE
NONE............... PROTOCOL
NORMAL MODE........ COMMUNICATIONS
<~>  7EH........... CONTROL PREFIX
<^>  5EH........... FORMAT PREFIX
<,>  2CH........... DELIMITER CHAR
ZPL II............. ZPL MODE
CALIBRATION........ MEDIA POWER UP
CALIBRATION........ HEAD CLOSE
DEFAULT............ BACKFEED
+000............... LABEL TOP
+0000.............. LEFT POSITION
DISABLED........... REPRINT MODE
049................ WEB SENSOR
080................ MEDIA SENSOR
051................ RIBBON SENSOR
050................ TAKE LABEL
027................ MARK SENSOR
027................ MARK MED SENSOR
003................ TRANS GAIN
016................ TRANS BASE
100................ TRANS LED
128................ RIBBON GAIN
128................ MARK GAIN
050................ MARK LED
DPCSWFXM........... MODES ENABLED
................... MODES DISABLED
 832 8/MM FULL..... RESOLUTION
2.0................ LINK-OS VERSION
V75.19.7ZP23143 <-. FIRMWARE
1.3................ XML SCHEMA
6.5.0 0x0012.0x0045 HARDWARE ID
4096k............R: RAM
65536k...........E: ONBOARD FLASH
NONE............... FORMAT CONVERT
FW VERSION......... IDLE DISPLAY
08/29/13........... RTC DATE
18:57.............. RTC TIME
DISABLED........... ZBI
2.1................ ZBI VERSION
READY.............. ZBI STATUS
62 LABELS.......... NONRESET CNTR
62 LABELS.......... RESET CNTR1
62 LABELS.......... RESET CNTR2
680 IN............. NONRESET CNTR
680 IN............. RESET CNTR1
680 IN............. RESET CNTR2
1,728 CM........... NONRESET CNTR
1,728 CM........... RESET CNTR1
1,728 CM........... RESET CNTR2
EMPTY.............. SLOT 1
EMPTY.............. SLOT 2
0.................. MASS STORAGE COUNT
0.................. HID COUNT
OFF................ USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Figure 2 • Sample Network Configuration Label



```
         Network Configuration

Zebra Technologies
ZTC ZT410-203dpi ZPL
XXXXXX-XX-XXXX

PrintServer........ LOAD LAN FROM?
INTERNAL WIRED..... ACTIVE PRINTSRVR

Wired*
ALL................ IP PROTOCOL
010.003.004.072.... IP ADDRESS
255.255.255.000.... SUBNET
010.003.004.001.... GATEWAY
010.003.001.098.... WINS SERVER IP
YES................ TIMEOUT CHECKING
300................ TIMEOUT VALUE
000................ ARP INTERVAL
9100............... BASE RAW PORT
9200............... JSON CONFIG PORT

Wireless
ALL................ IP PROTOCOL
000.000.000.000.... IP ADDRESS
255.255.255.000.... SUBNET
000.000.000.000.... GATEWAY
000.000.000.000.... WINS SERVER IP
YES................ TIMEOUT CHECKING
300................ TIMEOUT VALUE
000................ ARP INTERVAL
9100............... BASE RAW PORT
9200............... JSON CONFIG PORT
NOT INSERTED....... CARD INSERTED
H.................. CARD MFG ID
H.................. CARD PRODUCT ID
00:00:00:00:00:00.. MAC ADDRESS
YES................ DRIVER INSTALLED
INFRASTRUCTURE..... OPERATING MODE
125................ ESSID
100................ TX POWER
ALL................ CURRENT TX RATE
OPEN............... WEP TYPE
NONE............... WLAN SECURITY
1.................. WEP INDEX
000................ POOR SIGNAL
LONG............... PREAMBLE
NO................. ASSOCIATED
ON................. PULSE ENABLED
15................. PULSE RATE
OFF................ INTL MODE
not available...... REGION CODE
no region code..... COUNTRY CODE
0x3FFFFFFFFF....... CHANNEL MASK

Bluetooth
4.2.0.............. FIRMWARE
04/20/2012......... DATE
on................. DISCOVERABLE
2.1................ RADIO VERSION
on................. ENABLED
AC:3F:A4:12:0F:20.. MAC ADDRESS
XXXXXX-XX-XXXX..... FRIENDLY NAME
No................. CONNECTED
1.................. MIN SECURITY MODE
nc................. CONN SECURITY MODE

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

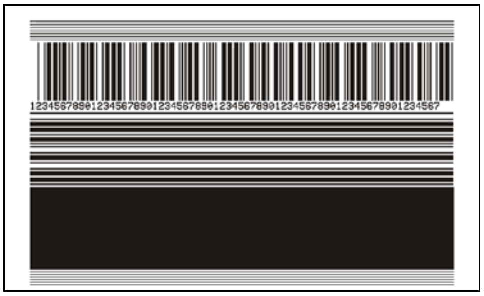
PAUSE Self Test

This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies or to determine if any printhead elements are not working. Figure 3 shows a sample printout.

To perform a PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold PAUSE while turning on (**I**) the printer. Hold PAUSE until the first control panel light turns off.
    - The initial self test prints 15 labels at the printer's slowest speed, and then automatically pauses the printer. Each time PAUSE is pressed, an additional 15 labels print. Figure 3 shows a sample of the labels.

Figure 3 • PAUSE Test Label



    - While the printer is paused, pressing CANCEL alters the self test. Each time PAUSE is pressed, 15 labels print at 6 in. (152 mm) per second.
    - While the printer is paused, pressing CANCEL again alters the self test a second time. Each time PAUSE is pressed, 50 labels print at the printer's slowest speed
    - While the printer is paused, pressing CANCEL again alters the self test a third time. Each time PAUSE is pressed, 50 labels print at 6 in. (152 mm) per second.
    - While the printer is paused, pressing CANCEL again alters the self test a fourth time. Each time PAUSE is pressed, 15 labels print at the printer's maximum speed.
3. To exit this self test at any time, press and hold CANCEL.

FEED Self Test

Different types of media may require different darkness settings. This section contains a simple but effective method for determining the ideal darkness for printing bar codes that are within specifications.

During the FEED self test, labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The bar codes on these labels may be ANSI-graded to check print quality.

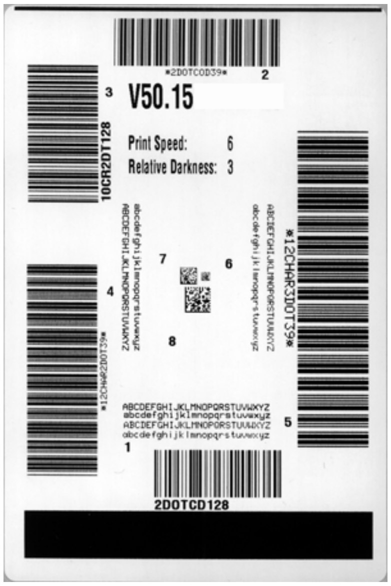
During this test, one set of labels is printed at 2 ips, and another set is printed at 6 ips. The darkness value starts at three settings lower than the printer's current darkness value (relative darkness of –3) and increase until the darkness is three settings higher than the current darkness value (relative darkness of +3).

To perform a FEED self test, complete these steps:

1. Print a configuration label to show the printer's current settings.
2. Turn off (**O**) the printer.
3. Press and hold FEED while turning on (**I**) the printer. Hold FEED until the first control panel light turns off.

   The printer prints a series of labels (Figure 4) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 4 • FEED Test Label



V50.15

Print Speed: 6
Relative Darkness: 3

2DOTCOD39
2
3
10CR2DT128
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
7
6
4
8
12CHAR2DOT39
12CHAR3DOT39
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
5
1
2DOTCD128

4. See Figure 5 and Table 8. Inspect the test labels and determine which one has the best print quality for your application. If you have a bar code verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a bar code verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 5 • Bar Code Darkness Comparison

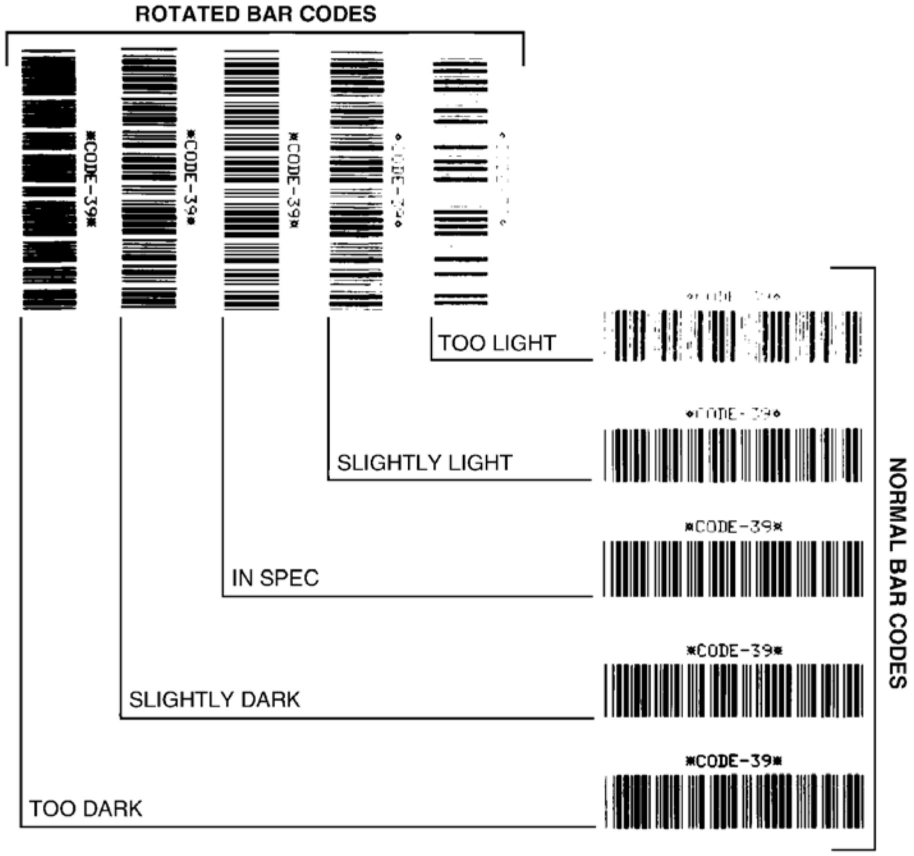

ROTATED BAR CODES
CODE-39
TOO LIGHT
SLIGHTLY LIGHT
IN SPEC
SLIGHTLY DARK
TOO DARK
NORMAL BAR CODES

Table 8 • Judging Bar Code Quality

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not "in-spec." • The normal bar code bars increase in size. • The openings in small alphanumeric characters may fill in with ink. • Rotated bar code bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. • The normal bar code will be "in-spec." • Small character alpha numerics will be bold and could be slightly filled in. • The rotated bar code spaces are small when compared to the "in-spec" code, possibly making the code unreadable.

Table 8 • Judging Bar Code Quality (Continued)

Print Quality	Description
“In-spec”	The “in-spec” bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics. • The normal bar code will have complete, even bars and clear, distinct spaces. • The rotated bar code will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark bar code, the bar code will be “in-spec.” • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferred to slightly dark ones for “in-spec” bar codes. • Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. • Both normal and rotated bar codes have incomplete bars and spaces. • Small alphanumeric characters are unreadable.

5. Note the relative darkness value and the print speed printed on the best test label.

6. Add or subtract the relative darkness value from the darkness value specified on the configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.

7. If necessary, change the darkness value to the darkness value on the best test label.

8. If necessary, change the print speed to the same speed as on the best test label.

FEED + PAUSE Self Test

Performing this self test resets the printer configuration to the factory default values. Perform a sensor calibration after this self test. (See *Calibrate the Ribbon and Media Sensors* on page 119.)

To perform a FEED and PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold FEED + PAUSE while turning on (**I**) the printer.
3. Hold FEED + PAUSE until the first control panel light turns off.

   The printer configuration is reset to the factory default values. No labels print at the end of this test.

CANCEL + PAUSE Self Test

Performing this self test resets the network configuration to the factory default values.

To perform a CANCEL and PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold CANCEL + PAUSE while turning on (**I**) the printer.
3. Hold CANCEL + PAUSE until the first control panel light turns off.

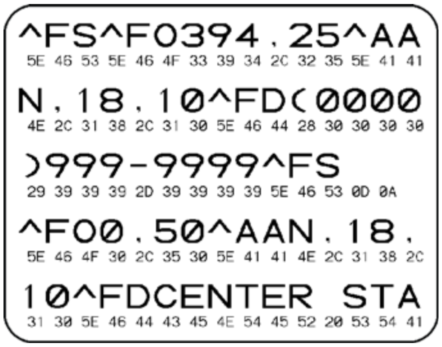
   The printer's network configuration is reset to the factory default values. No labels print at the end of this test.

Communication Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the printer and the host computer. When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). Figure 6 shows a typical test label from this test.

Note • The test label prints upside-down.

Figure 6 • Communications Diagnostics Test Label



```
^FS^FO394,25^AA
 5E 46 53 5E 46 4F 33 39 34 2C 32 35 5E 41 41
N,18,10^FD(0000
 4E 2C 31 38 2C 31 30 5E 46 44 28 30 30 30 30
)999-9999^FS
 29 39 39 39 2D 39 39 39 39 5E 46 53 0D 0A
^FO0,50^AAN,18,
 5E 46 4F 30 2C 35 30 5E 41 41 4E 2C 31 38 2C
10^FDCENTER STA
 31 30 5E 46 44 43 45 4E 54 45 52 20 53 54 41
```

To use communications diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See *Print Width* on page 69 for more information.

2. Set the DIAGNOSTICS MODE option to ENABLED. For methods, see *Communication Diagnostics Mode* on page 75.

   The printer enters diagnostics mode and prints any data received from the host computer on a test label

3. Check the test label for error codes. For any errors, check that your communication parameters are correct.

   Errors show on the test label as follows:

   - FE indicates a framing error.
   - OE indicates an overrun error.
   - PE indicates a parity error.
   - NE indicates noise.

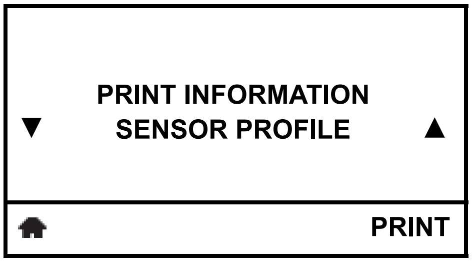
4. Turn the printer off (**O**) and then back on (**I**) to exit this self test and return to normal operation.

Sensor Profile

Use the sensor profile image (which will extend across several actual labels or tags) to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).
- The printer cannot detect ribbon.

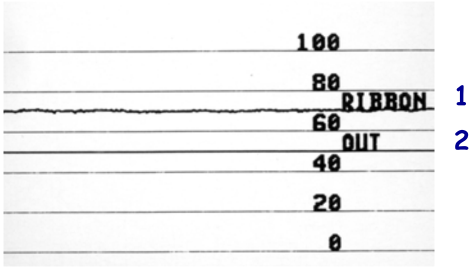
With the printer in the Ready state, print a sensor profile in one of these ways:

Using the buttons on the control panel	**a.** Turn off (**O**) the printer. **b.** Press and hold FEED + CANCEL while turning on (**I**) the printer. **c.** Hold FEED + CANCEL until the first control panel light turns off.
Using ZPL	**a.** Send the `~JG` command to the printer. See the *Zebra Programming Guide* for more information about this command.
Using the control panel display	**a.** Navigate to the following item under the SENSORS menu. See *Navigating through Screens in the Display* on page 90 for information about using the control panel and accessing the menus.  **b.** Press RIGHT SELECT to select PRINT.

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see *Calibrate the Ribbon and Media Sensors* on page 119).

Ribbon Sensor Profile (Figure 7) The line labeled RIBBON (**1**) on the sensor profile indicates the ribbon sensor readings. The ribbon sensor threshold setting is indicated by OUT (**2**). If the ribbon readings are below the threshold value, the printer does not acknowledge that ribbon is loaded.

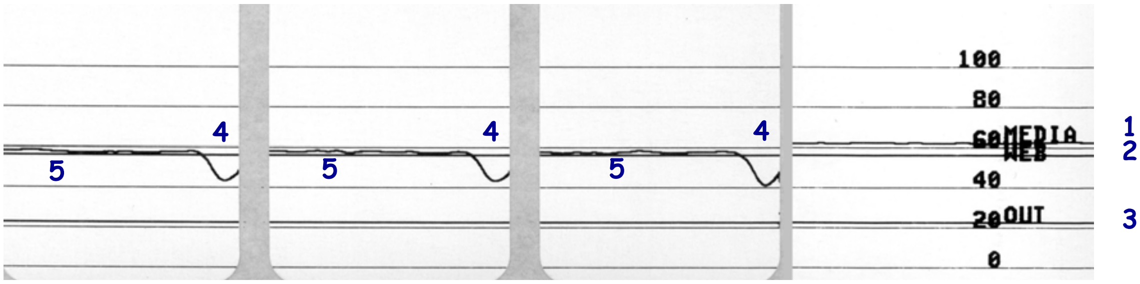
Figure 7 • Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 8) The line labeled MEDIA (**1**) on the sensor profile indicates the media sensor readings. The media sensor threshold settings is indicated by WEB (**2**). The media out threshold is indicated by OUT (**3**).The downward spikes (**4**) indicate gaps between labels (the web), and the lines between the spikes (**5**) indicate where labels are located.

If you compare the sensor profile printout to a length of your media, the spikes should be the same distance apart as the gaps on the media. If the distances are not the same, the printer may be having difficulty determining where the gaps are located.

Figure 8 • Sensor Profile (Media Section)



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6

Specifications

This section lists general printer specifications, printing specifications, ribbon specifications, and media specifications.

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General Specifications 174
Printing Specifications 175
Media Specifications 176
Ribbon Specifications. 177

General Specifications

Model		**ZT410™**	**ZT420™**
Height		12.8 in.(325 mm)	12.8 in. (325 mm)
Width		10.7 in. (272 mm)	13.2 in. (335 mm)
Depth		19.7 in. (500 mm)	19.7 in. (500 mm)
Weight		36 lb (16 kg)	40 lb (18 kg)
Electrical		90–265 VAC, 48-62 Hz	90–265 VAC, 48-62 Hz
Power consumption Printing PAUSE test at slowest speed		118.7 W	220.0 W
Power consumption Printer idle		12.0 W	12.0 W
Fuses		5A	5A
Temperature	Operating	Thermal Transfer: 41° to 104°F (5° to 40°C) Direct Thermal: 32° to 104°F (0° to 40°C)	
	Storage	–40° to 140°F (–40° to 60°C)	
Relative Humidity	Operating	20% to 85%, non-condensing	
	Storage	5% to 85%, non-condensing	
Communication Interfaces		**Standard Interfaces** • RS-232/CCITT V.24 serial data interface; 2400 to 115000 baud, parity, bits/character, 7 or 8 data bit, and XON-XOFF, RTS/CTS or DTR/DSR handshake protocol required. 750mA at 5 V from pins 1 and 9. • USB 1.1 data interface • USB host port • 10/100 internal Ethernet • Bluetooth version 2.1 • Near Field Communication (NFC) **Optional Interfaces** • 8-bit parallel data interface; nibble mode compliant • Wireless card support 802.11 b • 2.4GHz • DSSS (DBPSK, DQPSK and CCK) • RF power 10 mW (ZebraNet b/g Print Server) 802.11 g • 2.4GHz • OFDM (16-QAM and 64-QAM with BPSK and QPSK) • RF power 10 mW (ZebraNet b/g Print Server)	

Printing Specifications

Model		ZT410	ZT420
Print resolution		203 dpi (dots/in.)/8 dots/mm	203 dpi (dots/in.)/8 dots/mm
		300 dpi/12 dots/mm	300 dpi/12 dots/mm
		600 dpi/24 dots/mm	N/A
Dot size (nominal) (width x length)	203 dpi	0.0049 in. x 0.0049 in. (0.125 mm x 0.125 mm)	0.0049 in. x 0.0049 in. (0.125 mm x 0.125 mm)
	300 dpi	0.0033 in. x 0.0039 in. (0.084 mm x 0.099 mm)	0.0033 in. x 0.0039 in. (0.084 mm x 0.099 mm)
	600 dpi	0.0016 in. x 0.0016 in. (0.042 mm x 0.042 mm)	N/A
Maximum print width	203 dpi	4.09 in. (104 mm)	6.6 in. (168 mm)
	300 dpi	4.09 in. (104 mm)	6.6 in. (168 mm)
	600 dpi	4.09 in. (104 mm)	N/A
Bar code modulus (X) dimension			
Picket fence (nonrotated) orientation	203 dpi	4.9 mil to 49 mil	5 mil to 50 mil
	300 dpi	3.3 mil to 33 mil	3.3 mil to 33 mil
	600 dpi	1.6 mil to 16 mil	N/A
Ladder (rotated) orientation	203 dpi	4.9 mil to 49 mil	5 mil to 50 mil
	300 dpi	3.9 mil to 39 mil	3.9 mil to 39 mil
	600 dpi	1.6 mil to 16 mil	N/A
Programmable constant print speeds	203 dpi	2.4 in. to 14 in. (61 mm to 356 mm) per second in 1-in. (25.4 mm) increments	2.4 in. to 12 in. (61 mm to 305 mm) per second in 1-in. (25.4 mm) increments
	300 dpi	2.4 in. to 10 in. (61 mm to 254 mm) per second in 1-in. (25.4 mm) increments	2.4 in. to 10 in. (61 mm to 203 mm) per second in 1-in. (25.4 mm) increments
	600 dpi	1.5 in. to 4 in. (38 mm to 102 mm) per second in 1-in. (25.4 mm) increments	N/A

Media Specifications

Model			**ZT410**	**ZT420**
Label length	Minimum	Non-RFID		
		Tear-off	0.5 in. (12.7 mm)	0.5 in. (12.7 mm)
		Peel-off	0.5 in (12.7 mm)	0.5 in (12.7 mm)
		Rewind	0.5 in. (12.7 mm)	0.5 in. (12.7 mm)
		Cutter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
		RFID	Varies for each transponder type	
	Maximum	200 or 300 dpi	39 in. (991 mm)	39 in. (991 mm)
		600 dpi	20 in. (508 mm)	N/A
Maximum continuous media print length		200 dpi	157 in. (3988 mm)	102 in. (2590 mm)
		300 dpi	73 in. (1854 mm)	45 in. (1143 mm)
		600 dpi	39 in. (991 mm)	N/A
Label width	Minimum	Non-RFID	1.0 in. (25.4 mm)	2 in. (51 mm)
		RFID	Varies for each transponder type	
	Maximum	Tear/Cutter	4.5 in. (114 mm)	7.0 in. (178 mm)
		Peel/Rewind	4.25 in. (108 mm)	6.75 in. (171 mm)
Total thickness (includes liner, if any)		Minimum	0.0023 in. (0.058 mm)	0.0023 in. (0.058 mm)
		Maximum	0.010 in. (0.25 mm)	
Maximum roll outside diameter			8 in. (203 mm) on a 3-in. (76-mm) inside diameter core	
Inter-label gap		Minimum	0.079 in. (2 mm)	
		Preferred	0.118 in. (3 mm)	
		Maximum	0.157 in. (4 mm)	
Ticket/tag notch size (width x length)			0.25 in. x 0.12 in. (6 mm x 3 mm)	
Hole diameter			0.125 in. (3.18 mm)	
Notch or hole position (centered from inner media edge)		Minimum	0.15 in. (3.8 mm)	
		Maximum	2.25 in. (57 mm)	3.5 in. (90 mm)
Density, in Optical Density Units (ODU) (black mark)			> 1.0 ODU	
Maximum media density			≤ 0.5 ODU	
Transmissive media sensor (fixed position)			7/16 in. (11 mm) from inside edge	

Ribbon Specifications

Model		**ZT410**	**ZT420**
Ribbon width*	Minimum	2 in.** (51 mm**)	
	Maximum	4.33 in. (110 mm)	
Maximum ribbon length		1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter		1 in. (25 mm)	

* Zebra recommends using ribbon that is at least as wide as the media to protect the printhead from wear.

** Depending on your application, you may be able to use ribbon narrower than 2 in. (51 mm), as long as the ribbon is wider than the media being used. To use a narrower ribbon, test the ribbon’s performance with your media to assure that you get the desired results.

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Glossary

alphanumeric Indicating letters, numerals, and characters such as punctuation marks.

backfeed When the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when operating the printer in Tear-Off and Applicator modes.

bar code A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

black mark A registration mark found on the underside of the print media that acts as a start-of-label indication for the printer. (See *non-continuous media*.)

calibration (of a printer) A process in which the printer determines some basic information needed to print accurately with a particular media and ribbon combination. To do this, the printer feeds some media and ribbon (if used) through the printer and senses whether to use the direct thermal or thermal transfer print method, and (if using non-continuous media) the length of individual labels or tags.

configuration The printer configuration is a group of operating parameters specific to the printer application. Some parameters are user selectable, while others are dependent on the installed options and mode of operation. Parameters may be switch selectable, control panel programmable, or downloaded as ZPL II commands. A configuration label listing all the current printer parameters may be printed for reference.

continuous media Label or tag-stock media that has no notch, gap, or web (media liner only) to separate the labels or tags. The media is one long piece of material.

core diameter The inside diameter of the cardboard core at the center of a roll of media or ribbon.

diagnostics Information about which printer functions are not working that is used for troubleshooting printer problems.

die-cut media A type of label stock that has individual labels stuck to a media liner. The labels may be either lined up against each other or separated by a small distance. Typically the material surrounding the labels has been removed. (See *non-continuous media*.)

direct thermal A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method. Contrast this with *thermal transfer*.

direct thermal media Media that is coated with a substance that reacts to the application of direct heat from the printhead to produce an image.

dynamic RAM The memory devices used to store the label formats in electronic form while they are being printed. The amount of DRAM memory available in the printer determines the maximum size and number of label formats that can be printed. This is volatile memory that loses the stored information when power is turned off.

fanfold media Media that comes folded in a rectangular stack. Contrast this with *roll media*.

firmware This is the term used to specify the printer's operating program. This program is downloaded to the printer from a host computer and stored in FLASH memory. Each time the printer power is turned on, this operating program starts. This program controls when to feed the media forward or backward and when to print a dot on the label stock.

FLASH memory FLASH memory is non-volatile and maintains the stored information intact when power is off. This memory area is used to store the printer's operating program. In addition, this memory can be used to store optional printer fonts, graphic formats, and complete label formats.

Font A complete set of alphanumeric characters in one style of type. Examples include CG Times™, CG Triumvirate Bold Condensed™.

ips (inches-per-second) The speed at which the label or tag is printed. Many Zebra printers can print from 1 ips to 12 ips.

label An adhesive-backed piece of paper, plastic, or other material on which information is printed.

label backing (liner) The material on which labels are affixed during manufacture and which is discarded or recycled by the end-users.

light emitting diode (LED) Indicators of specific printer status conditions. Each LED is either off, on, or blinking depending on the feature being monitored.

liquid crystal display (LCD) The LCD is a back-lit display that provides the user with either operating status during normal operation or option menus when configuring the printer to a specific application.

media Material onto which data is printed by the printer. Types of media include: tag stock, die-cut labels, continuous labels (with and without media liner), non-continuous media, fanfold media, and roll media.

media sensor This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch used to indicate the start of each label.

media supply hanger The stationary arm that supports the media roll.

non-continuous media Media that contains an indication of where one label/printed format ends and the next one begins. Examples are die-cut labels, notched tag-stock, and stock with black mark registration marks.

non-volatile memory Electronic memory that retains data even when the power to the printer is turned off.

notched media A type of tag stock containing a cutout area that can be sensed as a start-of-label indicator by the printer. This is typically a heavier, cardboard-like material that is either cut or torn away from the next tag. (See *non-continuous media*.)

peel-off A mode of operation in which the printer peels a printed label away from the backing and allows the user to remove it before another label is printed. Printing pauses until the label is removed.

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second).

printhead wear The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of the printhead, use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead pressure necessary to produce good print quality. In the thermal transfer printing method, use ribbon that is as wide or wider than the media to protect the printhead from the rough media surface.

registration Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.

ribbon A band of material consisting of a base film coated with wax or resin “ink.” The inked side of the material is pressed by the printhead against the media. The ribbon transfers ink onto the media when heated by the small elements within the printhead. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

roll media Media that comes supplied rolled onto a core (usually cardboard). Contrast this with *fanfold media*.

supplies A general term for media and ribbon.

symbology The term generally used when referring to a bar code.

tag A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material.

tear-off A mode of operation in which the user tears the label or tag stock away from the remaining media by hand.

thermal transfer A printing method in which the printhead presses an ink or resin coated ribbon against the media. Heating the printhead elements causes the ink or resin to transfer onto the media. By selectively heating the printhead elements as the media and ribbon move past, an image is printed onto the media. Contrast this with *direct thermal*.

void A space on which printing should have occurred, but did not due to an error condition such as wrinkled ribbon or faulty print elements. A void can cause a printed bar code symbol to be read incorrectly or not at all.

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Zebra Technologies Corporation
Zebra Technologies Corporation
475 Half Day Road, Suite 500
Lincolnshire, IL 60069 USA
T: +1 847 634 6700
Toll-free +1 866 230 9494
F: +1 847 913 8766

Zebra Technologies Europe Limited
Dukes Meadow
Millboard Road
Bourne End
Buckinghamshire, SL8 5XF, UK
T: +44 (0)1628 556000
F: +44 (0)1628 556001

Zebra Technologies Asia Pacific, LLC
120 Robinson Road
#06-01 Parakou Building
Singapore 068913
T: +65 6858 0722
F: +65 6885 0838

http://www.zebra.com

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